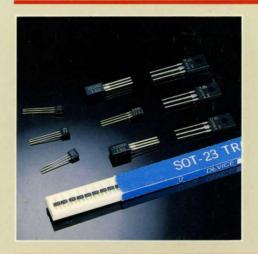


Transistor Data Book (Vol. 1)



1988

Small Signal TR

PRINTED IN KOREA

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SAMSUNG SEMICONDUCTOR DATA BOOK LIST

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- II. Transistor Data Book

Vol. 1: Small Signal TR

Vol. 2: Bipolar Power TR

Vol. 3: TR Pellet

III. Linear IC Data Book

Vol. 1: Audio/Video

Vol. 2: Telecom/Industrial/Data Converter IC

IV. MOS Product Data Book

V. High Performance CMOS Logic Data Book

VI. MOS Memory Data Book

VII. SFET Data Book

VIII. MPR Data Book

IX. CPL Data Book

X. Dot Matrix Data Book

TRANSISTOR DATA BOOK

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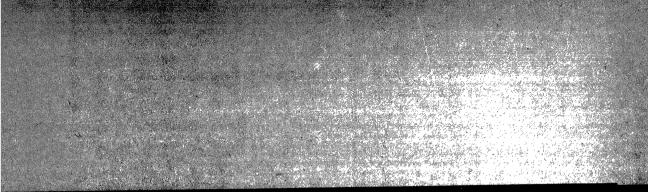
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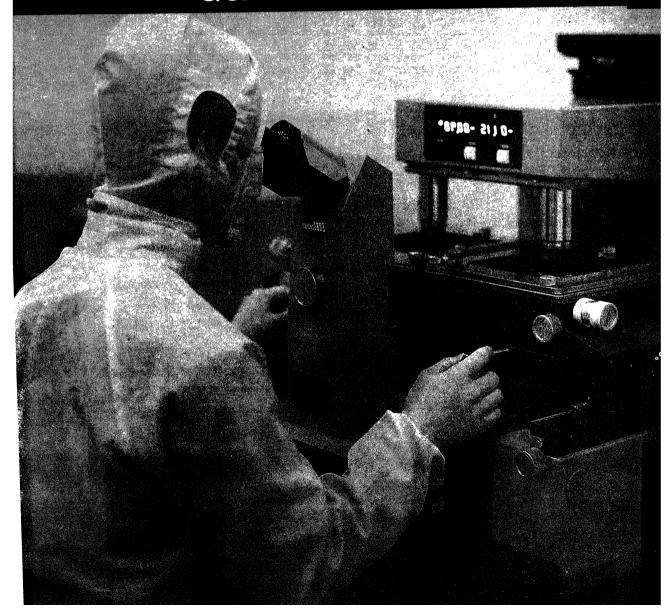
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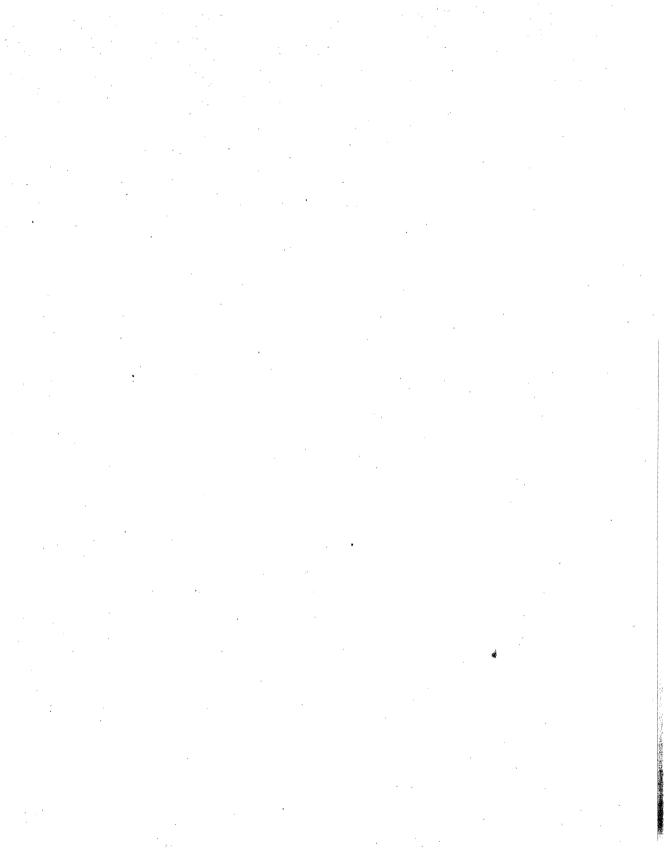
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QUALITY and RELIABILITY 1





1. Introduction

Samsung utilizes rigorous qualification and reliability programs to monitor the integrity of its devices. All industry standard (and various non-standard) stresses are run. Testing is done not only to collect data, but also to detect trends and product anomalies, with rectification to take place immediately (if necessary). This protects the customer from receiving discrepant material. Careful attention is given to any manufacturing changes, both through Engineering Change Notices and appropriate reliability stressing.

Items such as particular tests, frequency, sample sizes, acceptance criteria, and methods of stressing are detailed later in this chapter.

2. Policy

Samsung is committed to supplying high-quality semiconductors to its consumers. All product released for general sales has been fully tested and qualified. By meeting or exceeding normal industry standards for reliability, Samsung can confidently supply products to the world that will meet customer applications and reliability standards. Of course special programs can be run for customers who have particular requirements which are considered non-standard.

The quality organization must approve any product before it is officially qualified and sitributed. To do this most effectively, fully-functional devices must pass two critical stages prior to sales. Step 1 is product evaluation; step 2 is product qualification. Details are listed below.

3. Scope

Pass/Fail criteria are established by the quality assurance organization. All products have specifications which apply to then regarding reliability stressing, periodical monitoring, and final lot disposition:

The quality department is responsible for investigating mass-produced product for sicrepancies, and enforcing corrective actions. All outoging product goes through "QA-gating", where tests particularly critical to the product are accomplished. Only when quality assurance approves a device, either through qualification or gating acceptance, is it released. Fundamental "no-rework" policies ensure only highly reliable material leaves the factory. Testing is done to MIL-STD 883 and MIL-STD 750 standards, with sampling done in accordance with MIL-STD 19500E and MIL-STD 105D. Samsung also has internal specifications where its requirements exceed those of MIL-STDs.

4. Qualification Procedures

Procedures to qualify devices are listed below. There are both general and product-specific requirements. Procedures are detailed for new products, die-only qualifications, and package-only qualifications. The latter two are for products and/or packages already qualified, but where there is room for further product optimization.

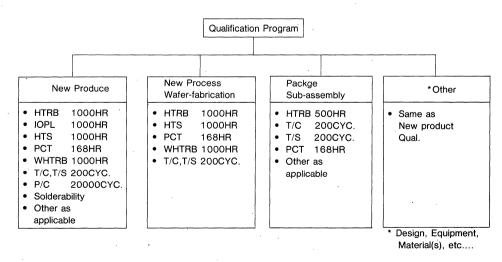


Fig. 1. Qualification Programs.



4.1 New product qualification test items

No.	Test Item	Test Condition	Sample Size	LTPD	ACC.	Reference Method	Note
1	High Temperature Reverse Bias (HTRB)	T _a =T _j (max) V _{CB} =0.8×V _{CBO} 1000HRS	45	10	1		48HR for PRT
. 2	High Temperature Storage (HTS)	T _a =T _j (max) 1000HRS	45	10	- 1		
3	Operating Life (OPL)	$T_a=25$ °C $P_c=P_c(max)$ 1000HRS	45	10	1	MIL-STD-750 1026.3	For Small- Signal Device
	Intermittent OPL (IOPL)	T _a =25°C P _c =P _c (max) 2min/2min On/Off 1000HRS	45	10	1	MIL-STD-750 1036.3	
5	Power Cycle (P/C)	ΔT _j =125°C 45Sec/90Sec On/Off 20000CYC.	45	10	1		For PWR TR,
6	Pressure Cooker Test (PCT)	T _a =121°C±2°C RH=100% 15PSIG 168HRS	45	10	1		48HR for PRT
7	Wet High Temperature Reverse Bias (WHTRB)	T _a =85°C, RH=85% V _{CB} =0.8×V _{CBO} 1000HRS	45	10	1		
8	Thermal Shock (T/S)	-65°C↔150°C (Liquid) 5min,<10Sec, 5min 200 Cycles	45	10	1	MIL-STD-883 1011	
9	Temperature Cycle (T/C)	-65°C↔25°C↔15°C 10min, 5min, 10min 200 Cycles	45	10	1	MIL-STD-883 1011	,
10	Solder Heat Resistance (S/H)	T _a =245°C±5°C t=10±1Sec (once with flux)	10	N/A	0	MIL-STD-750 2031	
11	Solderability	T _a =260°C±5°C t=5±0.5 sec Reject is>10% uncovered surface	10	N/A	0	MIL-STD-883 2003	-
12	Salt Atmosphere	T _a =35°C, 5% NaCl 24HRS	10	N/A	0	MIL-STD-883 1009A	
13	Mechanical Shock	1500G, 05ms 3 Times Each direction of X,Y and Z Axis	10	N/A	О	MIL-STD-750 2016	For Hermeitc
14	Vibration	20G, 3Axis f=100 to 2000 cps for 4min, 4 cycles	10	N/A	0	MIL-STD-883 2007	For Hermetic
15	Constant Acceleration	2000G X,Y,Z Axis 1 min for each Axis	10	N/A	0 .	MIL-STD-883 2001	For Hermetic
16	ESD (Human Body Model)	R=1.5kΩ C=100pF 5 Discharge V≥±1000V	5	N/A	0	MIL-STD-883 3015	

4.2 New process, wafer fabrication qualification

No	Test Item	Test Condition	Sample Size	LTPD	ACC No
1	High Temperature Reverse Bias (HTRB)	$T_a = T_j(max)$ $V_{CB} = 0.8 \times V_{CBO}$ $1000HRS$	45	10	1 .
2	High Temperature Storage (HTS)	T _a =T _j (max) 1000HRS	45	10	1
3	Pressure Cooker Test (PCT)	T _a =121°C±2°C RH=100% 15 PSIG • 168HRS	45	10	. 1
. 4	Wet High Temperature Reverse Bias (WHTRB)	T_a =85°C, RH=85% V_{CB} =0.8× V_{CBO} 1000HRS	45	10	1
5	Thermal Shock (T/S)	-65°C⇒150°C(Liquid) 5min,<10sec, 5min 200 cycles	45	10	1
6	Temperature Cycle (T/C).	-65°C = 25°C=150°C 10min, 5min, 10min 200 Cycles	45	10	1

4.3 Package Sub-Assembly Qualification

No	Test Item	Test Condition	Siample Size	LTPD	ACC No	Notes
1	High Temperature Reverse Bias (HTRB)	$T_a = T_j(max)$ $V_{CB} = V_{CBO} \times 0.8$ 500HRS	45	10	1	·
2	Temperature Cycle (T/C)	-65°C⇒25°C⇒150°C 10min, 5min, 10min 200 CYCLES	45	10	1	
3	Pressure Cooker Test (PCT)	T _a =121°C±2°C RH=100%, 15PSIG 168HRS	45	10	1	
4	Thermal Shock (T/S)	-65°C⇒150°C(Liquid) 5min,<10sec, 5min 200 CYCLES	45	10	1	,
5	Solder Heat Resistance (S/H)	260°C±5°C 10±1 sec Once without Flux	.10	N/A	. 0	
6	Vibration (Variable- Frequency)	100~2000~100Hz 20G, 5min, 5Times, X,Y,Z	10	N/A	0	
7	Mechanial Shock (M/S)	1500G, 0.5ms 3 Times, X,Y,Z	. 10	. N/A	0	
8	Constant Acceleration	20000G X,Y,Z Axis 1 min for each Axis	10	N/A	0	

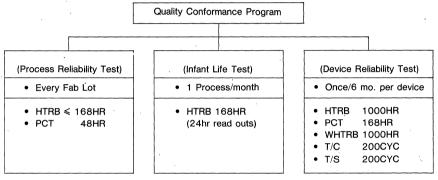
Note) • N/A: not available

5. Product Reliability (Quality Conformance) Monitors

Samsung implements periodic testing to monitor the ongoing reliability of its products. A subset of stresses used for qualification are run; they are seen as most critical for basic device reliability. Formally this is known as the Device Reliability Test System, or simply as DRT.

Lot-by-lot infant mortality reliability testing is also accomplished at Samsung. The purpose of this is to verify process integrity in a full QA step. Formally this is konwn as Process Reliability Testing, or more simply as PRT. Normally a short term accelerated lifetest and package reliability test are done, although exceptions are made in the case of special devices.

Although Samsung scrupulously utilizes statistical controls throughout it's production process, DRT and PRT serve as confirmation that indeed the customer does receive only high-grade units. The tables on the following give details of DRT and PRT processing.



Note: Test descriptions given on following pages.

Fig. 2. Quality Conformance Program

(PRT/DRT Product Stress Methodologies)

1. PRT (Process Reliability Test) Frequency: Every outgoing lot

No.	Test Item	Test Condition	Sample Size	LTPD	Accept. No.	Note
1	High Temperature Reverse Bias (HTRB)	$T_a=T_j(max)$ $V_{CB}=V_{CBO}\times 0.8$ 168HR max	45	10	1	
2	Pressure Cooker Test (PCT)	T _a =121°C±2°C 100% RH, 15PSIG 48HR	45	10	1	

2. ILT (Infant Life Test) Frequency: 1 Process/month

No.	Test Item	Test Condition	Sample Size	Note
1	High Temperature Reverse Bias (HTRB)	$T_a=T_j(max)$ $V_{CB}=V_{CBO}\times 0.8$ 168HR	300	for Discrete

3. DRT (Device Reliability Test)

No.	Test Item	Test Condition	Sample	LTPD*	Accept. No.	Note
1	High Temperature Reverse Bias (HTRB)	$T_a = T_j(max)$ $V_{CB} = V_{CBO} \times 0.8$ 1000HRS	45	5 10	0 1	
2	Pressure Cooker Test (PCT)	T _a =121°C±2°C RH=100%, 15PSIG 168HRS	45	5 10	0	
3	Wet High Temperature Reverse Bias (WHTRB)	T_a =85°C, RH=85% V_{CB} =0.8× V_{CBO} 1000HRS	45	5 10	0 1	
4	Temperature Cycle (T/C)	-65°C↔25°C↔150°C 10min, 5min, 10min 200 Cycles	45	5 10	0 1	
5	Thermal Shock (T/S)	−65°C↔150°C(Liquid) 5min,<10sec, 5min 200 Cycles	45	5 10	0 1	

^{*} LTPD 5: S Grade Units LTPD 10: A,B Grade Units.

6. Reliability Tests

The test run by the quality department are accelerated tests, serving to model "real world" applications through boosted temperatures, voltages, and/or humidities. Accelerated conditions are used to derive device knowledge through means quicker than that of typical application situations. These accelerated conditions are then used to assess differing failure rate mechanisms that correlate directly with ambient conditions. Following are summaries of various stresses (and their conditions) run by Samsung on discrete and integrated devices.

High Temperature Reverse Bias (80% max. BV_{CBO}, 150°C, static)

For this test, device integrity is checked through stressing of the main blocking junction at an elevated temperature and voltage. Overall product stability is investigated through leakage current monitoring; low leakage indicates good integrity.

Intermittent Operating Life (PMAX, 25°C, 2 min on/2 min off)

This test is normally applied to scrutinize die bond thermal fatigue. A stressed device undergoes an "on" cycle, where there is thermal heating due to power dissipation, and an "off" cycle, where there is thermal cooling due to lack of inputted power. Die attach (between die and package) and bond attach (between wire and die) are the critical areas of concern.

Wet High Temperature Reverse Bias (80% max. BV_{CBO}, 85°C, 85% R.H., static) or (V_{CC}=V_{CC}(typ), 85°C, 85% R.H, static)

Wet High Temperature Reverse Bias Test is used to accelerate failure mechanisms by applying static bias on alternate pins at high temperature and humidity ambient (85°C/85°C R.H.). This test checks for resistance to moisture penetration by using an electrolytic principle to accelerate corrosive mechanisms.

Pressure Cooker Test (Unbiased, 121°C, 15 PSIG, 100% R.H.)

The Pressure Cooker Test checks for resistance to moisture penetration. A highly pressurized vessel is used to force water (thereby promoting corrosion) into packaged devices located within the vessel.

High Temperature Storage (Unbiased, 150°C)

High Temperature Storage is utilized to test for both package and die weaknesses. For example, sensitivities to ionic contamination and bond integrity are closely scrutinized.

Temperature Cycling (Unbiased, -65°C to +150°C, air)

This stress uses a chamber with alternating temperatures of -65 °C and +150 °C (air ambient) to thermally cycle devices within it. No bias is applied. The cycling checks formechanical integrity of the packaged device, in particular bond wires and die attach, along with metal/polysilicon microcracks.

Thermal Shock (Unbiased, -65°C to +150°C, liquid)

This stress uses a chamber with alternating temperatures of -65° C to $+150^{\circ}$ C (liquid ambient) to thermally cycle devices within it. No bias is applied. The cycling is very rapid, and primarily checks for die/package compatibility.

Resistance to Solder Heat (Unbiased, 260°C, 10 sec)

Solder Heat Resistance is performed to establish that devices can withstand the thermal effects of solder dip, soldering iron, or solder wave operations.

Mechanical Shock (Unbiased, 1500g, Pulse=0.5msec)

This test determines the suitability of a device to be used in equipment where mechanical "shocks" may occur. Such shocks ersult from sudden or abrupt changes produced by rough (non-standard) handling, transportation, or field operations.

Variable Frequency Vibration (Unbiased, Range=100 to 2000 Hz)

Variable Frequency Vibration is done to model the effects of differential vibration in the specified range. Die attach and bonding integrity are particularly stressed, testing the mechanical soundness of device packaging.

Constant Acceleration (Unbiased, 10kg to 20kg)

This is an accelerated test designed to indicate types or modes of structural and mechanical weaknesses not necessarily detectable in Mechanical Shock and Variable Frequency Vibration stressing.

7. Failure criteria

Parameter ¹	Symbol	Unit	SCOPE	Min.	Max.
Collector Cut-off Current	Ісво	μΑ	COMMON	_	USLX2
Emitter Cut-off Current	ICEO	μΑ	COMMON	_	USLX2
		_	H _{FE} (min)<500	I.V.×0.8	I.V.X1.2
H _{FE} Variation Ratio	HFE		H _{FE} (min)≥500	I.V.×0.7	I.V.×1.3
)		_	H _{FE} (min)≥1000	I.V.×0.6	I.V.×1.4
Collector-Emitter Saturation Voltage	V _{CE} (sat)	mV	COMMON	LSL	USL
Base-Emitter Saturation Voltage	V _{BE} (sat)	mV	COMMON	LSL	USL
Thermal, Resistance	ΔV _{BE}	mV	Power	LSL	USL
Noise	N _E ,N _V	dB	Low Noise	_	USLX1.5

Note 1) USL: Upper Specification Limit 2) LSL: Lower Specification Limit 3) I.V.: Initial Value

8. Relative Stress Comparisons

Many stresses are run at Samsung on many different devices. Through both theoretical and actual results, it was clearly determined which stresses were most effective. Also established were the stresses which weren't fully effective.

Comparisons have been made on the basis of defects able to be determined, efficiency in detection, and cost. For the reader's benefit, Samsung provides the results of its conclusions on the following pages.

Comparison of Reliability Test Methods

Test Method	Defect	Effectivenss	Cost	Remarks
Internal Visual Inspection	Lead Structure Metallization Oxide Film Foreign Particles Die Bond Wird Bond Contamination Corroded Substrate	Good	Slightly Inexpensive to Moderate	This method of screening must be performed for high reliability devices. Cost is affected by the degree of visual inspection
Infrared ray	Design(thermal)	Very Good	Expensive '	For use in design evaluation only
Radiography	Die Bond Lead Structure(Gold) Foreign Particles Manufacturing (Gross Error) Seal Package Contamination	Extremely Good Good Good Good Good Good Good Good	Moderate	Advantage to using this screening method lies in the ability to test die frame/ header bonding, and to be able to perform inspection after sealing However, some materials being transparent to X-rays (for example, Al and Si) are not able to be analyzed. The use of the complex test system results in cost six times that of visual inspection.
High Temperature Storage	Electrical stability Metallization Bulk Silicon Corrosion	Good	Very Inexpensive	This is a highly desirable screening method
Temperature Cycling	Package Seal Die Bond Wire Bond Cracked Substrate Thermal Mismatching	Good	Very Inexpensive	This screening method is one of the most effective for use
Thermal Shock	Package Seal Die Bond Wire Bond Cracked Substrate Thermal Mismatching	Good	Inexpensive	While this screening method is similar to temperature cycling, it enables high stress levels as well. It is probably equal to the temperature cycling method.
Constant Accelertion	Lead Structure Die Bond Wire Bond Cracked Substrate	Good	Moderate	Doubt exists as to the effectiveness of screening aluminum wires with stress levels in the range of 0~20,000 G
Shock (Without Monitoring)	Lead Structure Fairly Poor		Moderate	Drop shock testing is thought to be inferior to constant acceleration methods. However, the pneupactor shock test is more effective. Shock test is a destructive test method.
Shock (With Monitoring)	h Intermittent Short Failry Good		Expensive	Visual inspection or radiography is more desirable for detection of particles



Comparison of Reliability Test Methods (continued)

Test Method	Defect	Effectivenss	Cost	Remarks
Vibration Fatigue	Lead Structure Package Die Bond Wire Bond Cracked Substrage	Fairly Poor	Expensive	This test is destructive and without merit.
Variable Frequency Vibration (Without Monitoring)	Package Die Bond Wire Bond Substrate	Fairly Poor	Expensive	
Variable Frequency Vibration (Without Monitoring)	Foreign Particles Lead Structure Intermittent Open	Fairly Good Good Good	Very Expensive	The effectiveness of the method for detecting particles depends on the type of particle
Random Vibration (Without Monitoring)	Package Die Bond Wire Bond Substrate	Good	Expensive	This screening method is more effective than variable frequency vibration(without monitoring), when used with equipment intended for space vehicle operation, although it is more expensive.
Random Vibration (With Monitoring)	Foreign Particle Lead Structure Intermittent Open	Fairly Good Good Good	Very Expensive	This is one of the most expensive screening methods
Vibrational Noise	Foreign Particles	Good	Expensive	
Radioisotope Leak Test	Package Seal	Good	Moderate	This screening method is effective for detecting leakage in the range 10E6~10E12 atm. ml/sec
Helium Leak Test	Package Seal	Good	Moderate	This screening method is effective for detecting leak in the range 10E6~10E12 atm. ml/sec
Gross Leak Test	Package Seal	Good	Inexpensive	Effectiveness is dependent upon volume. Testing is possible for detecting leaks above 10E-3 atm. ml/sec.
High Voltage Test	Oxide Film	Good	Inexpensive	Effectiveness Depends on structure
Insulation Resistance	Lead Structure Metallization Contamination	Fairly Good	Inexpensive	
Intermittent Operation	Metallization Bulk Silicon Oxide Film Inversion/Channeling Design Parmeter Drift Contamination	Good	Expensive	Probably about the same as AC operating life

Test Method	Defect	Effectivenss	Cost	Remarks
AC Operation	Metallization Bulk Silicon Oxide Film Inversion/Channeling Design Parmeter Drift Contamination	Very Good	Expensive	
DC Operation	Basically the Same as Intermittent Operation	Good .	Expensive	The AC operation life method is more effective for any failure mechanism
High Temperature AC Operation	Same as AC Operation Life Test	Extremely Good	Very Expensive	Failures are accelerated by temperature. This is probably the most expensive and one of the most effective screening methods.
High Temperature Reverse Bias	Inversion /Channeling	Fairly Poor	Expensive	

9. Reliability Test Results

Extensive test results have been compiled through long term reliability monitoring (DRT) of devices. Current and historical data is entered into Samsung's Reliability Newtork, SRN. Thus, past performance of a device or it's family, assembly evaluation results, manufacturing change reliability results, etcetera, can all be seen via computer through SRN.

Results included in this manual are representative of products stressed, and contain data fro mthe past year. Data is summarized from both die and package tests, on five critical stresses. Failure rates for long term life testing are in FITs, which are calculated using Arrhenius' Equation. (Arrhenius' Equation is summarized in the Appendix section). Samsung's failure rates are well below 50 FITs, which is acknowledged by customers and competitors alike as among the industry's elite.

9.1 Long Term Life Test Results

	Test Item	Steady	State Operation	on Life	High Temperature Storage Life							
	Test Condition	$T_a = T_j(m)$	nax.) V _{CB} = V _{CE} 1000 HRS	₈₀ × 0.8	T _a =125°C, 150°C 1000 HRS							
Family	Application	Number of Samples	Number of Failures	Failure Rate (FIT)	Number of Samples	Number of Failures	Failure Rate (FIT)					
TR	Small Signal	1228	4	8	430	2	14					
ın.	Power	1056	16	33	708	1	6					

Note 1) FIT: Failure in time or failure unit; represents the number of failures expected per 10° (one billion) device hours (at 55°C).

2) TR: Transistor

9.2 Environmental Test Resutis

	Test Item	High Te	mp/High h	lumidity	Pre	ssure Co	oker	Thermal Shock					
								85°C, 85% R.H, V _{CBO} × 0.8					
Family	Application	Number of Samples	of Rate		Number of Samples	Number of Failures	Failure Rate (%1 168HRS)	Number of Samples	Number of Failures	Failure Rate (%1 200CYC)			
TR	Small Signal	880	2	0.23	1020	12	1.2	1263	0	0			
•	Power	346	1	0.29	404	6	1.5	576	1	0.17			

10. Product Outgoing Quality Levels

The quality of Samsung products reaching customers has improved steadily over the years. Nearly on order of magnitude reduction in outgoing product PPM levels has been achieved from 1983-7. Results can be seen below.

Average Outgoing Quality, or AOQ, is measured by the Quality Assurance Department. Prior to release, product is sampled according to MIL-STD 105D. Both electrical and visual/mechanical inspections occur. If inspection standards are met, product is approved for sales. Depending on the nature of the failure(s), rejected samples can cause an entire lot to be 100% tested and/or inspected, re-worked to screen out defective devices, or scrapped.

Electrical testing is typically done to product specification limits, guardbanded by a fixed percentage. Visual/mechanical inspection is performed to check for key package, marking, and lead parameters. (More extensive details are provided in Chapter 3, Assembly process control)

Although Samsung's AOQ levels are acceptable, efforts are constantly underway to reduce the figures (thereby increasing outgoing quality).

Enhanced focus on statistical process control in the manufacturing operation should help Samsung achieve it's goal of 50 PPM in 1988.

Samsung Product Electrical AOQ levels

(in PPM)

Product Family	1983	1984	1985	1986	1987
Small-Signal Transistor	526	509	308	150	45
Power Transistor	968	1289	578	664	101

Samsung Product Visual/Mechanical AOQ Levels

(in PPM)

Product Family	1983	1984	1985	1986	1987
Small-Singal Transistor	362	816	596	129	57
Power Transistor	452	1589	1297	796	140

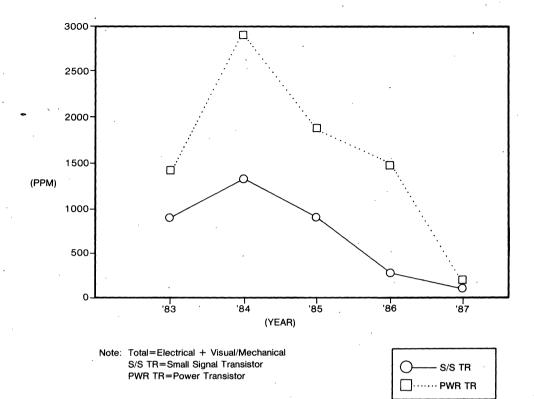
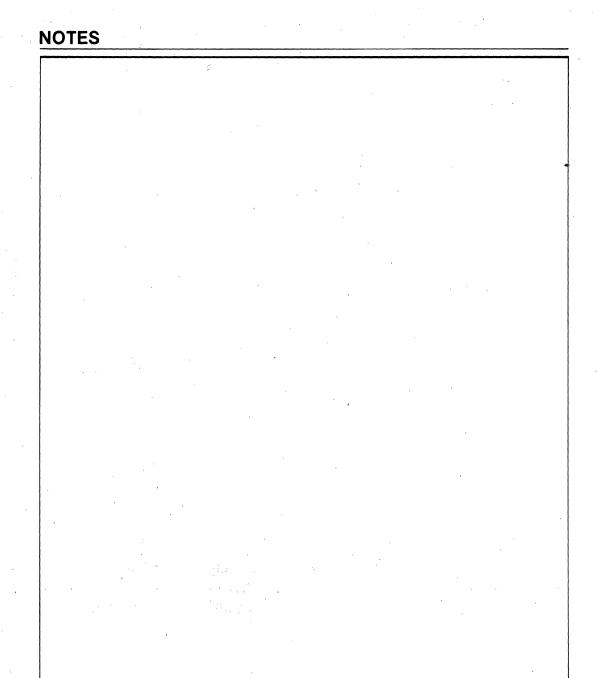
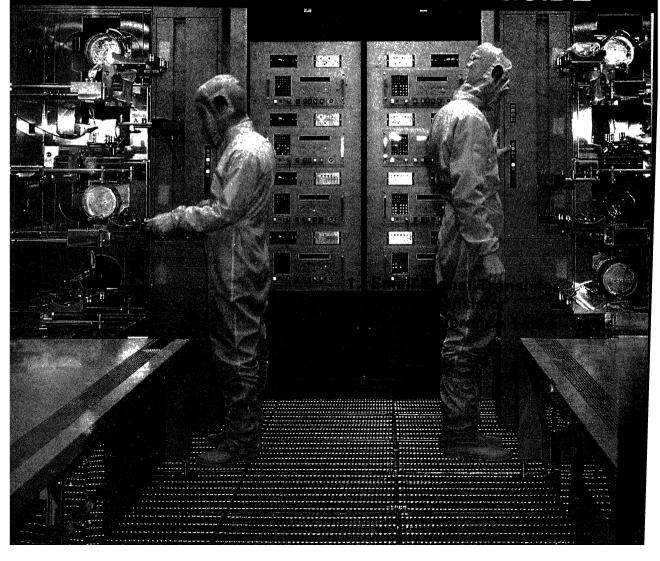


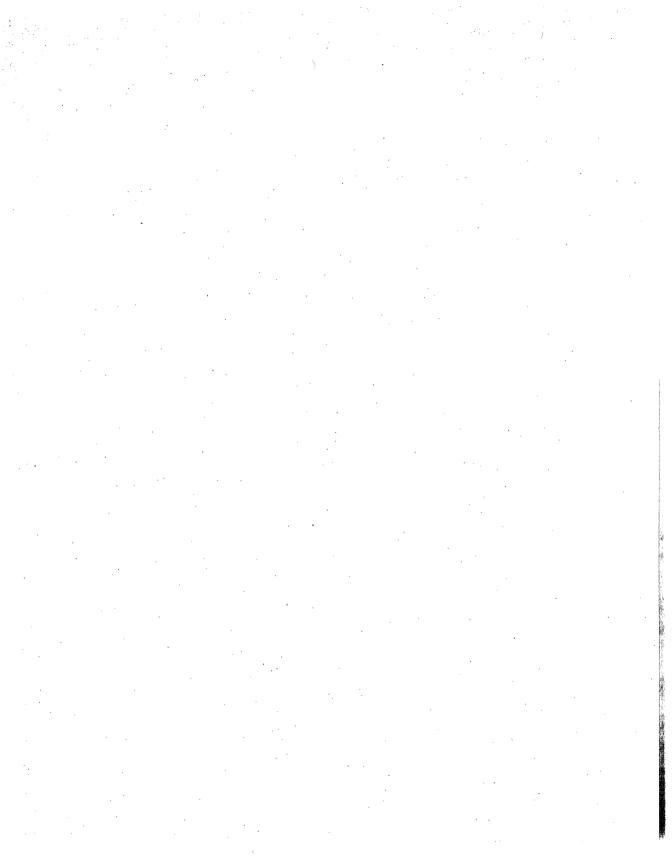
Fig. 3. Total AOQ Levels





FUNCTION GUIDE 2





1. SMALL SIGNAL TRANSISTORS

1.1 General Purpose Transistors

1.1.1 SOT-23 Type Transistors

Device and Po	larity (Marking)			Con	dition	, t	FE	Con	dition	V _{CE} (sat),	V _{BE} (sat) (V)	Cor	dition	f _T (MH2)
NPN	PNP	V _{CEO}	Ic (A)	V _{CE} (V)	I _C (mA)	MIN	MAX	lc (mA)	lg (mA)	V _{CE} (sat) MAX .	V _{BE} (sat) MAX	V _{CE} (V)	lc (mA)	MIN	TYP
MMBTA06(1G)	MMBTA56(2G)	80	0.5	1	100	50		100	10	0.25		2	10	100	
MMBTA05(1H)	MMBTA55(2H)	60	0.5	1	100	50		100	10	0.25		2	10	100	
	MMBT2907A(2F).	60	0.6	10	150	100	300	500	50	1.6	2.6	20	-50	200	
KSC1623(C1X)	KSA812(D1X)	50	0.1	6	1	90	600	100	10	0.3	1	6	10		250
	BCW69(H1)	45	0.1	5	2	120	260	10	0.5	. 0.3	i .				Ì
	BCW70(H2)	45	0.1	5	2	215	500	10	0.5	0.3			1	ĺ	
BCW71(K1)		45	0.1	5	2	110	220	50	2.5			5	10		300
BCW72(K2)		45	0.1	5	2	200	450	50	2.5			5	10		300
BCX70G(AG)		45	0.1	5	2	120	220	50	1.25	0.55	1.05	5	10	125	
BCX70H(AH)		45	0.1	5	2	180	310	50	1.25	0.55	1.05	5	10	125	
BCX70J(AJ)		45	0.1	5	2	250	460	50	1.25	0.55	1.05	5	10	125	
BCX70K(AK)		45	0.1	5	. 2	380	630	50	1.25	0.55	1.05	5	10	125	
	BCX71G(BG)	45	0.1	5	2	120	220	50	1.25	0.55	1.05				
	BCX71H(BH)	45	0.1	5	2	180	310	50	1.25	0.55	1.05				
	BCX71J(BJ)	45	0.1	5	2	250	460	50	1.25	0.55	1.05				
	BCX71K(BK)	45	0.1	5	2	380	630	50	1.25	0.55	.1.05				
	MMBA811C5(C5)	45	0.05	3	0.5	135	270	20	2	0.3		6	1	75	
	MMBA811C6(C6)	45	0.05	3	0.5	200	400	20	2	0.3		6	1	75	1
	MMBA811C7(C7)	45	0.05	3	0.5	300	600	20	2	0.3		6	1	75	
	MMBA811C8(C8)	45	0.05	3	0.5	450	900	20	2	0.3	}	6	1	75	
MMBC1623L3(L3)	MMBA812M3(M3)	40	0.1	6	1	60	120	30	3	0.5		-			
MMBC1623L4(L4)	MMBA812M4(M4)	40	0.1	6	1	90	180	30	3	0.5		<u> </u>			
MMBC1623L5(L5)	MMBA812M5(M5)	40	0.1	6	1	135	270	30	3	0.5					
MMBC1623L6(L6)	MMBA812M6(M6)	40	0.1	6	1	200	400	30	3	0.5					
MMBC1623L7(L7)	MMBA812M7(M7)	40	0.1	6	1	300	600	30	3	0.5					
MMBT2222A(1P)	,,	40	0.6	10	150	100	300	500	50	1.6	2.6	20	20	300	
	MMBT2907(2B)	40	0.6	10	150	100	300	500	50	1.6	2.6	20	50	200	
MMBT3903(1Y)	,	40	0.2	1	10	50	150	50	5	0.3	0.95	20	10	250	
MMBT3904(1A)	MMBT3906(2A)	40	0.2	1	10	100	300	50	5	0.3	0.95	20	10	300	
MMBT4401(2X)	MMBT4403(2T)	40	0.6	1	150	100	300	500	50	0.75	1.2	10	10	250	
MMBTA20(1C)	MMBTA70(2C)	40	0.1	10	5	40	400	10	1	0.25		10	5	125	
MMBC1622D6(D6)		35	0.1	3	0.5	200	400	100	10	0.3		6	1	100	
MMBC1622D7(D7)		35	0.1	3	0.5	300	600	100	10	0.3	}	6	1	100	1
MMBC1622D8(D8)		35	0.1	3	0.5	450	900	100	10	0.3		6	1	100	
BCW60A(AA)	BCW61A(BA)	32	0.1	5	2	120	220	50	1.25	0.55	1.05	5	10	125	
	BCW61B(BB)	32	0.1	5	2	180	310	50	1.25	0.55	1.05	5	10	125	
	BCW61C(BC)	32	0.1	5	2	250	460	50	1.25	0.55	1.05	5	10	125	
	BCW61D(BD)	32	0.1	5	2	380	630	50	1.25	0.55	1.05	5	10	125	
MMBT2222(1B)	/	30	0.6	10	150	100	300	500	50	1.6	2.6	20	20	200	
KSC2859(E1X)	KSA1182(F1X)	30	0.5	1	100	70	240	100	10	0.25		6	20		200
MMBT4123(5B)	MMBT4125(ZD)	30	0.2	1	2	50	150	50	5	0.3	0.95	20	10	250	
, ,	KSA1298(J1X)	25	0.8	1	100	100	320	500	20	0.4	5.55	5	10		120
KSC3265(K1X)															

SOT-23 Type Transistors (Continued)

Dovice and Bo	elarity (Marking)			Condition		h _{FE}		Condition		V _{CE} (sat), V _{BE} (sat) (V)		Condition		f _T (MHz)
NPN	PNP	V _{CEO}	Ic (A)	V _{CE} (V)	l _C (mA)	MIN	MAX	I _C (mA)	I _B (mA)	V _{CE} (sat) MAX	V _{BE} (sat) MAX	V _{CE} (V)	l _C (mA)	MIN	ТҮР
MMBC1009F2(F2)		25	0.05	3	0.5	40	80	10	1	0.3		6	1	150	
MMBC1009F3(F3)		25	0.05	3	0.5	60	120	10	1 .	0.3		6	1	150	
MMBC1009F4(F4)		25	0.05	3	0.5	90	180	10	1	0.3		6	1	150	
MMBC1009F5(F5)		25	0.05	3	0.5	135	270	10	1	0.3	,	6	1	150	}
MMBT4124(ZC)	MMBT4126(C3)	25	0.2	1	2	120	360	50	5	0.3	0.95	20	10	300	
	BCW29(C1)	20	0.1	5	2	120	260	10	0.5	0.3					
	BCW30(C2)	20	0.1	5	2	215	500	10	0.5	0.3		Ì			
BCW31(D1)		20	0.1	5	2	110	220	10	0.5	0.3			1		
BCW32(D2)	,	20	0.1	5	2	200	450	10	0.5	0.3					
BCW33(D3)	·	20	0.1	5	2	420	800	10	0.5	0.3					

1.1.2 TO-92S Type Transistors

Device	and Polarity			Con	dition	,	hFE	Conc	dition	V _{CE}	(sat),	V _{BE} (sa	t) (V)	Cor	dition	f _T (MHz)
NPN	PNP	V _{CEO}	Ic (A)	V _{CE} (V)	l _C (mA)	MIN	MAX	l _C (mA)	l _B (mA)	V _{CE} (s	at) MAX	V _{BE}	(sat) MAX	V _{CÉ} (V)	ic (mA)	MIN	TYP
	KSA1150	20	0.5	1	100	40	400	500	50	0.3	0.4	1	1.3	6	10		
	KSA1378	25	0.3	1	50	70	400	300	30	0.35	0.6						Ì
	KSB810	25	0.7	1	100	70	400	700	70	0.25	0.4	0.95	1.2	6	10	50	160
	KSB811	25	1	0	1Ó0	70	400	1000	100		0.5		1.2	6	10	}	110
KSC2710	}	20	0.5	1	100	40	400	500	50	0.18	0.4				İ		
KSC3488		25	0.3	1	50	70	400	300	30	0.14	0.4					ļ	
KSD1020		25	0.7	1	100	70	400	700	. 70	0.2	0.4	0.95	1.2	6	10	50	170
KSD1021		30	1	1	100	70	400	1000	100		0.5		1.2	6	10		130

1.1.3 TO-92 Type Transistors

Device	and Polarity			Con	dition	1	¹FE	Conc	lition	V _{CE} (sat),	V _{BE} (sat) (V)	Cor	dition	f _T (MHz)
NPN	PNP	V _{CEO}	Ic (A)	V _{CE} (V)	I _C (mA)	MIN	MAX	lc (mA)	i _B (mA)	V _{CE} (sat) MAX	V _{BE} (sat) MAX	V _{CE} (V)	lc (mA)	MIN	ТҮР
MPSA06	MPSA56	80	0.5	1	100	50		100	10	0.25		2	10	100	
MPS8099	MPS8599	80	0.5	5	1	100	300	100	10	0.3		5	10	150	
KSC2003	KSA954	80	0.3	1	50	90	400	300	- 30	0.6	1.2	6	10	50	100
KSD1616A	KSB1116A	60	1	2	100	135	400	1000	50	0.3	1.2	2	100	70	
KSC1008	KSA708	60	0.7	2	50	40	240	500	50	0.7	1.1	10	50		50
	MPS2907A	60	0.6	10	150	100	300	500	50	1.6	2.6	20	50	200	
MPS8098	MPS8598	60	0.5	5	1	100	300	100	10	0.3		5	10	150	
MPSA05	MPSA55	60	0.5	1	100	50	,	100	10	0.25		2	10	100	
KSC2002	KSA953	60	0.3	1	. 50	90	400	300	30	0.6	1.2	6	10	50	100
KSC853	KSA545	60	0.2	1	50	40	400	150	15	0.5	1.2				
KSD1616	KSB1116	50	. 1	2	100	135	600	1000	50	0.3	1.2	2	100	70	100
KSC1072	KSA707	45	0.7	2	50	40	240	500	50	0.7	1.1		}		
KSC815	KSA539	45	0.2	1	0.05	40	240	150	15	0.5	1.2		1	ĺ	
SS9014	SS9015	45	0.1	5	1	60	1000	100	5	0.3	1	5	10	150	270

TO-92 Type Transistors (continued)

Dovid	e and Polarity			Con	dítion	. 1	hFE	Cond	dition	V _{CE} (sat),	V _{BE} (sat) (V)	Cor	dition	f _T (MHz)
NPN	PNP	V _{CEO}	lc (A)	V _{CE} (V)	I _C (mA)	MIN	MAX	I _C (mA)	I _B (mA)	V _{CE} (sat) MAX	V _{BE} (sat) MAX	V _{CE}	I _C (mA)	MIN	TYP
MPS6602		40	1	1	500	50		1000	100	0.6		10	50	100	
2N4401	2N4403	40	0.6	1	150	100	300	500	50	0.75	1.2	10	20	200	
MPS2222A	MPS2907	40	0.6	10	150	100	300	500	50	1.6	2.6	20	20	300	ļ
2N4400	2N4402	40	0.6	1	150	50	150	500	50	0.75	1.2	10	20	200	ł
2N3903	2N3905	40	0.2	1	10	50	150	50	5	0.3	0.95	20	10	250	
2N3904	2N3906	40	0.2	1	10	100	300	50	5	0.3	0.95	20	10	300	
MPS6513	MPS6517	40	0.1	10	2	90	180	50	5	0.5					
MPSA10		40	0.1	10	5	40	400					10	5	125	
MPSA20	MPSA70	40	0.1	10	5	40	400		ĺ			10	5	125	ĺ
KSC1330		40	0.1	6	1	70	400	30	3	0.5		6	10		300
KSD471A	1	30	1	1	100	70	400	1000	100	0.5	1.2	6	10	1	130
MPS3705	MPS3703	30	0.6	5	50	30	150	50	5	0.25		5	50	100	
MPS3704		30	0.6	2	50	100	300	100	5			2	50	100	
MPS2222		30	0.6	10	150	100	300	500	50	1.6	2.6	20	20	250	
KSC921		30	0.1	10	2	40	240	10	1	0.6		10	1	100	250
KSC839		30	0.1	12	2	40	400	10	1	0.4		10	1	80	200
SS9011		. 30	0.03	5	1	28	198	10	1	0.3					İ
SS8050	SS8550	25	1.5		100	85	300	800	80	0.5	1.2	10	50	100	190
	KSB564A	25	1		100	70	400	1000	100	0.5	1.2	10	10		110
MPS6601	MPS6651	25	1 '		500	50		1000	100	0.6		10	50	100	
	MPS3702	25	0.6		50	60	300	50	50	0.25		1	50	100	ļ
MPS6560	MPS6562	25	0.5		500	50	200	500	50	0.5		5	10	60	
KSD227	KSA642	25	0.3		50	70	400	300	30	0.6		1			
MPS5172		25	0.1		10	100	500	10	1.	0.25			2		120
KSC184	KSA542 ·	25	0.05		1	40	400	20	2	0.3		6	1		100
MPS3706		20	0.6		50	30	600	100	5	1		2	50	100	
KSD261	KSA643	20	0.5		100	40	400	500	50	0.4	1.3	1	}		
SS9013	SS9012	20	0.5		50	64	202	500	50	0.6	1.2	1			

1.1.4 TO-92L Type Transistors

Davice a	nd Polarity			Con	dition	, 1)FE	Conc	lition	V _{CE} (sat), '	BE (sat) (V)	Cor	dition	f _T (MHz)
NPN	PNP	V _{CEO}	Ic (A)	V _{CE} (V)	I _C (mA)	MIN	MAX	I _C (mA)	I _B (mA)	V _{CE} (sat) MAX	V _{BE} (sat) MAX	V _{CE}	l _C (mA)	MIN	ТУР
KSC2328A	KSA928A	30	2	2	500	100	320	1500	30	2		2	500		120
KSC2331	KSA931	60	0.7	2	50	40	240	500	50	0.7	1.2	10	50	١.	100
KSC2500		10	2	1	500	140	600	2000	50	0.5		1	500		150

1.2 Low Noise Transistors

1.2.1 SOT-23 Type Transistors

Device and De	lanitus (Mantrian)					Con	dition	h	FE	Condi	tion	V _{CE(sat)} (V)
NPN	larity (Marking)	MAX	Condition Frequency	V _{CEO}	I _C (A)	V _{CE} (V)	I _C (mA)	MIN	MAX	lc (mA)	i _B (mA)	V _{CE} (sat) MAX
MMBT6428(1K)		4	Audio	50	0.2	5	0.1	250	650	100	5	0.6
MMBT6429(1L)		4	Audio	45	0.2	5	0.1	500	1250	100	5	0.6
MMBT2484(1U)		3	Audio	60	0.05	5	1	250		1	0.1	0.35
	MMBT5086(2P)	3	Audio	50	0.05	5	0.1	150	500	10	1	0.3
·MMBT5088(1Q)		3	Audio	30	0.05	5	0.1	300	900	10	1	0.5
	MMBT5087(2Q)	2	Audio	50	0.05	5	0.1	250	800	10	1	0.3
MMBT5089(1R)		2	Audio	25	0.05	5	0.1	400	1200	10	1	0.5

1.2.2 TO-92S Type Transistors

Device and Po	larity(Marking)	NF	(dB)	V _{CEO}	Ic	Con	dition	h	FE	Conc	lition	V _{CE} (sat)	Con	dition	f _T	(MHz)
NPN	PNP	TYP	Condition Frequency	(V)	(A)	V _{CE} (V)	I _C (mA)	MIN	MAX	l _c (mA)	I _B (mA)	MAX	V _{CE}	l _c (mA)	MIN	TYP
KSA1175 KSC2785	,	· 6	Audio Audio	50 50	0.15 0.15	6 6	1	40 40	700 700	100 100	10 10	0.3 0.3	6 6	10 10		180 300

Audio = 10Hz to 15.7KHz

1.2.3 TO-92 Type Transistors

Davis	and Polarity		JE(JB)			Con	dition	h	FE	Condi	tion	Saturation Voltage(V)
NPN	PNP	ТҮР	NF(dB) Condition Frequency	V _{CEO}	Ic (A)	V _{CE} (V)	I _C (mA)	MIN	MAX	I _C (mA)	I _B (mA)	V _{CE} (sat) MAX
2N6428		6	Audio	50	0.2	5.	0.1	250	650	100	5	0.6
2N4123		6	Audio	30	0.2	1	2	50	150	. 50	5	0.3
	2N4125	5	Audio	30	0.2	1	2	50	150	50	5	0.4
2N4124		5	Audio	25	0.2	1	2	120	360	50	5	0.3
KSC945	KSA733	4	Audio	50	0.15	6	1.	40	700	100	10	0.3
	2N4126	4	Audio	25	0.2	· 1	2	120	360	50	5	0.4
	MPS4249	3	Audio	60		5	0.1	100	300	10	0.5	0.25
	2N5086	3	Audio	50	0.05	5	0.1	150	500	10	• 1 •	0.3
2N5088		3	Audio	30	0.05	-5	0.1	300	900	10	1	· 0.5
	MPS6522	3	Audio	25	0.1	10	2	200	400	50	5	0.5
MPS6520		3	Audio	25	0.1	10	2	200	400	50	5	0.5
	MPS6523	3	Audio	25	0.1	10	2	300	600	50	5	0.5
MPS6521		3	Audio	25	0.1	10	2	300	600	50	5	0.5
	MPS4250A	2	Audio	60		5	0.1	250	700	10	0.5	0:25
	2N5087	2	Audio	50	0.05	5	0.1	250	800	10	1	0.3
	MPS4250	2	Audio	40		5	0.1	250	700	10	0.5	0.25
2N5089		2	Audio	25	0.05	5	0.1	400	1200	10	1	0.5
2N6428A		*4	Audio	50	0.2	5	0.1	250	650	100	5	·0.6
	2N5210	*2	Audio	. 50	0.05	5	0.1	200	600	10	1	0.7
2N5209		*2	Audio	50	0.05	5	0.1	100	300	10	1	0.7
MPS8097		*2	Audio	40	0.2	5	0.1	250	700			1
KSC1222	KSA640	**40	Audio	45	0.05	3	0.5	120	1000	20	2	0.3
KSC900		**30	Audio	25	0.05	3	0.5	120	1000	20	2	0.2

Audio=10Hz to 15.7KHz

^{*=}MAX, **=Noise Level



1-3. RF/VHF/UHF Amplifier Transistors

1-3-1. SOT-23 Type Transistors

Davisa	Con	dition	f	т	Cob	V _{CEO}	Gpe	Con	dition	h	FE	NF(dB)		AGC	Condition
Device NPN	V _{CE}	lc (mA)	MIN	TYP	(pF)	(V)	(dB)	V _{CE}	lc (mA)	MIN	MAX	MAX	Condition f(MHz)	(mA)	Gain Reduction (dB)
	-	<u> </u>							<u> </u>						
KSC2734(H8Z)	10	10	1400	3500	1.5	12		10	5	20	200				
KSC3120(H9Z)	10	. 2	1500	2400	#0.9	15	\$12	10	5	40	200	*8	800		
KSC2759(H6X)	10	5	1250	2000	1.3	14	&10	10	5	40	180			}	
MMBR5179	6	5	900	2000	@1	12	15	1	3	25	250	4.5	200		
KSC2757(H3X)	10	5	800	1100	1.5	15		10	5	60	240				
KSC2758(H4Z)	10	3	750	1000	0.8	25	14	10	3	60	240	4.5	900	11	30
MMBTH10(3E)	10	4	650		@0.7	25	}	10	4	60					
KSC2756(H2X)	10	5	500	850	#0.5	20	\$15	10	5	60	240	*6.5	200		
MMBTH24(3A)	10	8	400	620	@0.36	30	\$19	10	8	30					
KSC2755(H1X)	10	3	400	600	#0.5	30	20	10	3	60	240	3	200	12	30
KSC2223(H5X)	6	1	400	600	*1	20		6	11	40	180	*3	100		
KSC3125(A1Z)	10	10	250	600	1.6	25		10	10	20	200				
KSC2715(B1X)	10	1	100		3.2	30	27	12	2	40	240			·	

1.3.2 TO-92S Type Transistors

Device	Con	dition	f _T (N	IHz)	С _{ов} (pF)	V _{CEO}	G _{PE} (dB)	Con	dition		h _{FE}		N _F (dB)	Condi-
(NPN)	V _{CE} (V)	l _C (mA)	MIN	ΤΎΡ	(PF)	(V)	MIN	V _{CE} (V)	l _C (mA)	MIN	ŢYР	MAX	MAX	tion f _T (MHz)
KSC2669	10	1	100	250	3.2	30		12	2	40		240		
KSC2786	6	1	400	600	*1.2	20	18	6	1	40		240	5	100
KSC2787	6	1	150	300	2.5	30	ŀ	6	1	40	ł	240		

1-3-2 TO-92 Type Transistors

Device	Cond	dition		f⊤	Cob	V _{CEO}	Gpe	. Con	dition	r	FE	NF(dB)		I _{AGC}	Condition Gain
NPN	V _{CE} (V)	lc (mA)	MIN	ТҮР	(pF)	(V)	(dB)	V _{CE}	lc (mA)	MIN	MAX	MAX	Condition f(MHz)	(mA) MAX	Reduction (dB)
MPS5179	6	5	900	2000	@1	12	15	1	3	25	250	4.5	200		
KSC1730	10	5	800	1100	1.5	15		10	5	40	240				
MPSH17	10	5	800		@0.9	15	*24	10	5	25	250	6	200		
KSC1070***	10	3	750	1000	0.8	25	14	10	3	40	200	4	900	11	30
SS9018	5	5	700	1100	1.7	15		5	1	28	198				
MPSH11	10	4	650		@0.7	25		10	4	60					
MPSH10	10	4	650 ⁻		@0.7	25		10	4	60					
KSC1395	10	5	600	1100	1.5	15		10	5	40	240.				
MPSH24	10	8	400	620	@0.36	30	\$19	10	8	30					
KSC1393	10	3	400	700	#0.5	30	20	10	2	40	240	3	200	12	30
KSC1394	10	3	400	700	#0.5	30	20	10	2	40	240	3.5	200		
MPSH20	10	4	400	620	@0.65	30	\$18	10	4	25					
SS9016	5	1	400	620	1.6	20		5	1	28	198	5	100		
KSC1187	10	3	400	700	#*0.6	20	20	10	2	40	240				
KSC1188	10	3	400	700	1	20	20	.10	2	40	240				
KSC1674	6	1	400-	600	* 1.5	20	18	6	1	40	240	5	100		
KSC388	12.5	12.5	300		2	25	28	12	12.5	20	200				
KSC1675	6	1	150	300	2.5	20		6	1	40	240				
KSC838	10	1	100	250	3.2	30		12	2	40	240				

^{*=}TYP, #=Cre, @=Ccb, \$=Gce, &=Gcb, *** = DISK TYPE TRANSISTOR

1-4. High Voltage Transistors

1-4-1. SOT-23 Type Transistors

Device and po	olarity(Marking)	V _{CEO}		Con	dition	r)FE ·	Co	nditioħ		uration ge(V)	Cor	ndition	f.	T(MHz)
NPN	PNP	(V)	(A)	V _{CE} (V)	lc (mA)	MIN	MAX	lc (mA)	I _B (mA)	V _{CE}	V _{BE} MAX	V _{CE} (V)	ic (mA)	MIN	түр
MMBTA42(1D)	MMBTA92(2D)	300	0.5	10	30	40		20	2	0.5	0.9	20	10	50	
MMBTA43(1E)	MMBTA93(2E)	200	0.5	10	30	40	ĺ	20	2	0.5	0.9	20	10	50	ļ į
	MMBT5401(2L)	150	0.5	1 5	10	60	240	50	5	0.5	1	10	10	100	
MMBT5550(1F)	,	140	0.6	5	10	60	250	50	5	0.25	1.2	10	10	100	

1-4-2. TO-92S Type Transistors

Device and po	larity(Marking)			Cond	lition	h	FE	Cond	lition	Vc	_E (sat), V	_{BE} (sat)	(V)	Cond	ition	f _T	(MHz)
		V _{CEO}	l _c	Y _{CE}	Ic			Ic	l _B	Vce	(sat)	VBE	(sat)	V _{CE}	Ic		
NPN	PNP	. (V)	(A)	(V)	(mA)	MIN	MAX	(mA)	(mA)	TYP	MAX	TYP	MAX	(V)	(mA)	MIN	TYP
	KSA1174	120	0.05	6	1	200	800	10	1	0.09	0.3			6 -	1	50	100
KSC2874		120	0.05	6	1	200	1200	10	1	0.07	0.3			6	1	50	110

1-4-3. TO-92 Type Transistors

Device and or	plarity(Marking)	V _{CEO}	l _c	Con	dition	h	FE	Cor	dition		uration ige(V)	Con	dition	fı	Γ(MHz)
NPN	. PNP	(V)	I _C (A)	V _{CE}	lc (mA)	MIN	MAX	lc (mA)	I _B	V _{CE} MAX	V _{BE}	V _{CE} (V)	lc (mA)	MIN	ТҮР
MPSA44		400	0.3	10	10	50	200	10	1	0.5	0.75				
2N6517	2N6520	350	0.5	10	30	30	200	30	3	0.5	0.9	20	10	40	
MPSA45		350	0.3	10	10	50	200	10	1	0.5	0.75				
MPSA42	MPSA92	300	0.5	10	30	40		20	2	0.5	0.9	20	10	50	
2N6516	2N6519	300	0.5	10	30	45	270	30	3	0.5	0.9	20	10	40	
KSC1506		300	0.1	10	10	40	240	50	5	2		30	10	40	80
2N6515	2N6518	250	0.5	10	30	50	300	30	3	0.5	0.9	20	10	40	
MPSA43	MPSA93	200	0.5	10	30	40		20	2	0.5	0.9	20	10	50	
2N5551		160	0.6	5	10	80	250	50	6	0.2	1	10	10	100	
	KSA709	150	0.7	2	50	40	240	200	20	0.4	1	10	50		50
	2N5401	150	0.6	5	10	60	240	50	5	0.5	1	10	10	100	
KSC1009		140	0.7	2	50	40	240	200	20	0.2	0.86	10	50	30	50
2N5550		140	0.6	5	10	60	250	50	5	0.25	1.2	10	10	100	
	2N5400	120	0.6	5	10	40	180	50	5	0.5	1	10	10	100	
MPSL01	1	120	0.15	5	10	50	300	50	5	0.3	1.4	10	10	60	
KSC1845	KSA992	120	0.05	6	1	200	800	10	1	0.3		6	1	50	100
	MPSL51	100	0.6	-5	50	40	250	50	5	0.3	1.2	10	10	60	

1-4-4. TO-92L Type Pransistors

		V _{CEO}		Condition			h _{FE}		Condition		Condition		f _{T(MHz)}		
NPN	plarity(Marking)	(V)	l _c (A)	V _{CE}	lc (mA)	MIN	MAX	lc (mA)	I _B (mA)	Volta V _{CE} (sat) MAX	ge(V) V _{BE} (sat) MAX	V _{CE}	lc (mA)	MIN	түр
KSC2340		350	0.1	10	20	30	150	10	1	0.5	10	20	50		
KSC2330		300	0.1	10	20	40	240	10	1	0.5		30	10		50
KSC2383	KSA1013	160	1	5	200	60	320	500	50	1.5		5	200	15	50
KSC2310	KSA910	150	0.05	5	10	40	240	10	1	0.8		30	10		100
KSC2316	KSA916	120	0.8	, 5	100	80	240	500	50	1		5	100		120



1-5. Darlington Transistors

1-5-1. SOT-23 Type Transistors.

Device and polarity(Marking)		V _{CES}	Ic	Condition		h _{FE}		Condition V _{CE} (sat)V _{BE} (sat)(V)				Co	ndition	f _{T(MHz)}	
NPN	PNP	(V)	(A)	V _{CE} (V)	lc (mA)	MIN	MAX	lc (mA)	I _B (mA)	V _{CE} (sat) MAX	V _{BE} (sat) MAX	V _{CE}	ic (mA)	MIN	ТҮР
MMBT6427(1V)		*40	0.5	5	100	20K	200K	500	0.5	1.5	2				
MMBTA13(1M)		30	0.3	5	100	10K		100	0.1	1.5		5	10	125	ļ
MMBTA14(1N)		30	0.3	5	100	10K		100	0.1	1.5		5	10	125	
	MMBTA63(2U)	30	0.5	5	100	10K		100	0.1	1.5	5	10	125		
	MMBTA64(2V)	30	0.5	5	100	10K		100	0.1	1.5	5	10	125		

^{*:} V_{CEO}

1-5-2. TO-92 Type Transistors.

Device and Polarity		V _{CES}	Ic	Condition		h _{FE}		(Conditio	n V _{CE} (sat)V _B	E(sat)(V)	Coi	ndition $f_{T(MHz)}$			
NPN	PNP	(V)	(A)	V _{CE} (V)	lc (mA)	MIN	MAX	ic (mA)	l _B	V _{CE} (sat) MAX	V _{BE} (sat) MAX	V _{CE} (V)	lc (mA)	MIN	TYP	
MPSA27		60	0.5	5	100	10K		100	0.1	1.5						
	MPSA77	60	0.5	5	100	10K		100	0.1	1.5				}		
MPSA26		50	0.5	5	100	10K		100	0.1	1.5				l		
	MPSA76	50	0.5	5	100	10K		100	0.1	1.5	{	-				
2N6427		*40	0.5	5	100	20K	200K	500	0.5	1.5	2					
	MPSA75	40	0.5	5	100	10K		100	0.1	1.5						
MPSA25		40	0.5	5	100	10K		100	0.1	1.5	İ			1		
MPSA14	MPSA64	30	0.5	5	100	10K		100	0.1	1.5		5	10	125		
MPSA13	MPSA63	30	0.5	5	100	20K	l	100	0.1	1.5		5	10	125		
MPSA12	MPSA62	20	0.5	5	10	20K		10	0.01	1						

^{*:} V_{CEO}

1-6. Digital Transistors

1-6-1. SOT-23 Type Transistors

Device and Polarity		R1	R2	V _{CEO}	Ic	I _C Condition		ition h _{FE}		Condition		V(sat)(V)		Condition		f _T (MHz)
	•					V _{CE}	lc]		lc	ĺB	V _{CE}	(sat)	V _{CE}	lc	
NPN	PNP	ΚΩ	ΚΩ	(V)	(mA)	(V)	(mA)	MIN	MAX	(mA)	(mA)	TYP	MAX	(V)	(mA)	TYP
KSR1101	KSR2101	4.7	4.7	50	100	5	10	20		10	0.5	0.1	0.3	10	5	250/200
KSR1102	KSR2102	10	10	50	100	5	4	30		10	0.5	0.1	0.3	10	5	250/200
KSR1103	KSR2103	22	22	50	100	5	5	56		10	0.5	0.1	0.3	10	5	250/200
KSR1104	KSR2104	47	47	50	100	5	5	68		10	0.5	0.1	0.3	10	5	250/200
KSR1105	KSR2105	4.7	10	50	100	5	5	30		10	0.5	0.1	0.3	10	5	250/200
KSR1106	KSR2106	10	47	50	100	5	5	68		10	0.5	0.1	0.3	10	5	250/200
KSR1107	KSR2107	22	47	50	100	5	5	68		10	0.5	0.1	0.3	10	5	250/200
KSR1108	KSR2108	47	22	50	100	5	5	56		10	0.5	0.1	0.3	10	5	250/200
KSR1109	KSR2109	4.7		40	100	5	5	100	600	10	1	0.1	0.3	10	5	250/200
· KSR1110	KSR2110	10		40	100	5	1	100	600	10	1	0.1	0.3	10	5	250/200
KSR1111	KSR2111	22		40	100	5	1	100	600	10	1	0.1	0.3	10	5	250/200
KSR1112	KSR2112	47.		40	100	5	1	100	600	10	1	0.1	0.3	10	5	250/200
KSR1113	KSR2113	2.2	47	50	100	5	5	68		10	0.5	0.1	0.3	10	5	250/200
KSR1114	KSR2114	4.7	47	50	100	5	5	68		10	, 0.5	0.1	0.3	10	5	250/200

1-6-2. TO-92S Type Transistors

Device and	d Polarity	R1	R2	VCEO	Ic		Conditio	n	h _{FE}	Co	ndition	V _{CE}	(sat)(V)	Con	dition	f _T (MHz)
NPN .	PNP	KΩ	кΩ	(V)	(mA)	·V _{CEO}	l _c (mA)	MIN	MAX	lc (mA)	I _B (mA)	V _{CE} TYP	(sat) MAX	V _{CE} (V)	I _C (mA)	ТҮР
KSR1201	KSR2201	4.7	4.7	50	100	5	10	20		10	0.5	0.1	0.3	10	5	250/200
KSR1202	KSR2202	10	10	50	100	5	4	30		10	0.5	0.1	0.3	10	5	250/200
KSR1203	KSR2203	22	22	50	100	5	5	56		10	0.5	0.1	0.3	10	5	250/200
KSR1204	KSR2204	47	47	50	100	5	5	68		10	0.5	0.1	0.3	10	5	250/200
KSR1205	KSR2205	4.7	10	50	100	5	- 5	30		10	0.5	0.1	0.3	10	5	250/200
KSR1206	KSR2206	-10	47	50	100	5	5	68		10	0.5	0.1	0.3.	10	5	250/200
KSR1207	KSR2207	22	47	50	100	5	5	68		10	0.5	0.1	0.3	10	5	250/200
KSR1208	KSR2208	47	22	50	100	5	5	56		10	0.5	0.1	0.3	10	5	250/200
KSR1209	KSR2209	4.7		40	100	5	5	100	600	10	1	0.1	0.3	10	5	.250/200
KSR1210	KSR2210	10		40	100	5	1	100	600	10	1	0.1	0.3	10	5	250/200
KSR1211	KSR2211	22		40	100	5	1	100	600	10	1	0.1	0.3	10	5	250/200
KSR1212	KSR2212	47		40	100	5	1	100	600	10	1	0.1	0.3	10	5	250/200
KSR1213	KSR2213	2.2	47	50.	100	5	5	68		10	0.5	0.1	.0.3	10	5	250/20
KSR1214	KSR2214	4.7	47	50	100	5	5	68		10	0.5	0.1	0.3	10	5	250/20

1-6-3. TO-92 Type Transistors

Device a	nd Polarity	R1	R2	V _{CEO}	· Ic	Co	ndition		h _{FE}	Cor	dition	V(s	at)(V)	Con	dition	f _T (MHz)
		١.,				V _{CE}	lc		1	Ic	I ₈	V _{CE}	(sat)	V _{CE}	Ic	
NPN	PNP ·	ΚΩ	ΚΩ	(V)	(mA)	(V)	(mA)	MIN	MAX	(mA)	(mA)	TYP	MAX	(V)	(mA)	TYP
KSR1001	KSR2001 ,	4.7	4.7	5,0	100	5	10	20		10	0.5	0.1	0.3	10	5	250/200
KSR1002	KSR2002	10	10	50	100	5	5	30		10	0.5	0.1	0.3	10	5	250/200
KSR1003	KSR2003	22	22	50	100	5	5	56		10	0.5	0.1	. 0.3	10	5	250/200
KSR1004	KSR2004	47	47	50	100	5	5	68		10	0.5	0.1	0.3	10	5	250/200
KSR1005	KSR2005	4.7	10	50	100	5	-5	30		10	0.5	0.1	0.3	10	5	250/200
KSR1006	KSR2006	10	47	50	100	5	5	68		10	0.5	0.1	0.3	10	5	250/200
KSR1007	KSR2007	22	47	50	100	5	5	68		10	0.5	0.1	0.3	10	5	250/200
KSR1008	KSR2008	47	22	50	100	5	5	- 56		10	0.5	. 0.1	0.3	10	5	250/200
KSR1009	KSR2009	4.7		40	100	5	1	100	600	10	1	0.1	0.3	10	5	250/200
KSR1010	KSR2010	10		40	100	5	1	100	600	10	1	0.1	0,3	10	5	250/200
KSR1011	KSR2011	22		40	100	5	1	100	600	10	1	0.1	0.3	10	. 5	250/200
KSR1012	KSR2012	47		40	100	5	1	100	600	10	1	0.1	0.3	10	5	250/200
KSR1013	KSR2013	2.2	47	50	100	5	5	68		10	.0.5	0.1	0.3	10	5	250/200
KSR1014	KSR2014	4.7	47	50	100	5	5	68		10	0.5	0.1	0.3	10	5	250/200

1.7 JUNCTION FETS

1.7.1 SOT-23 Type J-FET.

DEVICE	V _{GDO}	IG	PD		loss (mA)		g _m (mS)			V _{GS(OFF)}		.(V)
DEVICE	(V)	(mA)	(mW)	MIN	MAX	V _{DS} (V)	MIN	TYP	V _{DS} (V)	V _{DS} (V)	Ι _D (μΑ)	MIN	MAX
KSK123	20	2	200	0.13	0.47	4.5	0.9	1.6	4.5				
KSK211	18	10	200	1	10	10		9	10	10	1	0.4	4

1.7.2 TO-92S Type J-FET

DEVICE	V _{GDO}	la.	PD		loss(i	mA)		g _m (mS))		V _G	(OFF)		(V)
DEVIOL	(V)	(mA)	(mW)	MIN	MAX	V _{DS} (V)	MIN	TYP	MAX	V _{DS} (V)	VDS	Ι _D (μΑ)	MIN	MAX
KSK65	12	2	20	0.04	0.8	4.5	0.3	0.5		4.5				
KSK161	.18	10	200	1	10	10		9		10	10	1	0.4	4

1.7.3 TO-92 Type J-FET

DEVICE	V _{GDO}	la	PD		loss (mA)		g _m (mS)			V _{GS(OFF)}		(V)
DEVICE	(V)	(mA)	(mW)	MIN	MAX	V _{DS} (V)	MIN	ТҮР	V _{DS} (V)	V _{DS} (V)	Ι _D (μΑ)	MIN	MAX
KSK30	50	10	100	0.3	6.5	10	1.2		10	10	0.1	0.4	5
KSK117	50	10	300	0.6	14	10	4	15	10	10	0.1	0.2	1.5

2. POWER TRANSISTORS

2-1. General Purpose Transistors

2.1.1 TO-126 Type Transistors

Ic	V _{CEO}	Device	Туре		h _{FE}				V _{CE(SA}	T) (V)			f _T (N	IHz)		Pc
(A)	(V)	NPN	PNP	V _{CE} (V)	I _C (A)	MIN	MAX	I _C (A)	I _B (A)	ТҮР	MAX	V _{CE} (V)	l _C (A)	MIN	TYP	(W)
0.1	180	KSC2682	KSA1142	5	0.01	100	320	0.05	0.005	0.16	0,5	10	0.02		180	8
0.2	300	KSC2688		10	0.01	40	250	0.05	0.005		1.5	30	0.01	50	80	10
0.5	300	MJE340	MJE350	10	0.05	30	240									20
1.2	120	KSC2690	KSA1220	5	0.3	60	320	- 1	0.2	0.4	0.7	5	0.2		175	20
	160	KSC2690A	KSA1220A	5	0.3	60	320	1	0.2	0.4	0.7	5	. 0.2		1.1	20
3	30	KSD882	KSB772	2	1	60	400	2	0.2	0.3	0.5	5	· 0.1		80	10
	40	MJE180	MJE170	1	0.1	50	250	3	0.6		1.7	10	0.1	50		12.5
	45	KSD794	KSB744	5	0.5	60	320	1.5	0.15	0.5	2	5	0.1		45	10
	60	KSD794A	KSB744A	5	0.5	60		1.5		0.5	2	5	0.1		45	10
		MJE181	MJE171	1	0.1	50	250	3	0.6		1,.7	10	0.1	50		12.5
	80	MJE182	MJE172	1	0.1	50	250	3	0.6		1.7	10	0.1	50	,	12.5
5	25	MJE200	MJE210	,1	2	45	180	2	0.2		0.75	10	0.1	65		15
	60	KSD1691	KSB1151	1.	2	100	400	2	0.2	0.1	0.3					20

2.1.2 TO-202 Type Transistors

	.,	Device '	Гуре		hFE				V _{CE(SA}	T) (V)			f⊤(M	lHz)		Pc
Ic (A)	V _{CEO}	NPN	PNP	V _{CE} (V)	l _C (A)	MIN	MAX	lc (A)	l _B (A)	ТҮР	MAX	V _{CE} (V)	lc (A)	MIN	TYP	(W)
0.2	250	KSC1520		10	0.01	40	240	0.05	0.005		2	30.	0.01	40	80	10
	300	KSC1520A		10	0.01	40	240	0.05	0.005		2	30	0.01	40	80	10
2	30	KSC1096	KSA634	5	1	40	240	1.5	0.15	0.3	0.7					10
	45	KSC1098	KSA636	5	0.5	40	240	1	0.1	0.15	0.7					10

2.1.3 TO-220 Type Transistors

		Device	э Туре		h _{FE}				V _{CE(SA}	т) (V)			f _T	(MHz)		Pc
lc (A)	V _{CEO}	NPN	PNP	V _{CE}	Ic (A)	MIN	MAX	I _C	I _B	ТҮР	MAX	V _{CE}	lc (A)	MIN	TYP	(W)
0.2	300	KSC1507	FIRE	10	0.01	40	240	0.05	0.005	111	2	30	0.01	40	80	15
1	40	TIP29	TIP30	4	1	15	75	1	0.125		0.7	10	0.2	3	- 30	30
} '	60	TIP29A	TIP30A	4	1	15	75	1	0.125		0.7	10	0.2	3		30
	80	TIP29B	TIP30B	4	1	15	75	1	0.125		0.7	10	0.2	3		30
	100	JIP29C	TIP30C	4	1	15	75	1	0.125		0.7	10	0.2	3		30
	250	TIP47	TIPSOC	10	0.3	30	150	1	0.123		0.1	10	0.2	10		40
1	300	TIP48		10	0.3	30	150	1	0.2		0.1	10	0.2	10		40
		TiP49											0.2			
	350	 		10	0.3	30	150	1	0.2		0.1	10		10		40
1.5	400	TIP50	K04040	10	0.3	30	150	1	0.2		0.1	10	0.2	10		40
1.5	150	KSC2073	KSA940	10	0.5	40	140	0.5	0.05		1.5	10	0.5	4		25
2	150	KSD401	KSB546	10	0.4	40	240		0.0	0.0	0.0	10	0.4		5	25
3	30	KSC1173	KSA473	2	0.5	70	240	2	0.2	0.3	0.8	2	0.5		100	10
	40	TIP31	TIP32	4	3	10	50	3	0.375	0.15	1.2	10	0.5	3		40
	55	KSD288	KSA614	5	0.5	40	240	1	0.1	0.15	0.5	10		_		25
	60	TIP31A	TIP32A	4	3	10	50	3	0.375		1.2	10	0.5	3		40
		KSD880	KSB834	5	0.5	60	200	3	0.3	0.5		5	0.5		9	30
		KSC1983		4	0.5	500		2	0.05		1	12	0.2		15	30
	80	TIP31B	TIP32B	4	3	10	50	3	0.375		1.2	10	0.5	3		40
	100	TIP31C	TIP32C	4	3	10	50	3	0.375		1.2	10	0.5	3		40
4	60	KSC2233		5	1	30	150	4	0.4		1	5	0.5		10	40
	80	KSD526	KSB596	.5	0.5	40	240	3	0.3	1.0	1.7	5	0.5	3		30
5	60	KSD73		10	1	70	240	5	0.5		2	10	0.3		20	30
	70	KSD362		,5	5	20	140	5	0.5		1	5	0.5		10	40
	100	KSC2517		5	2	40	200	3	0.3		0.6					30
6	40	TIP41	TIP42	4	3	15	75	6	0.6		1.5	10	0.5	3		65
	60	TIP41A	TIP42A	4	3	15	75	6	0.6		1.5	10	0.5	3		65
	80	TIP41B	TIP42B	4	3	15	75	6	0.6		1.5	10	0.5	3		65
	100	TIP41C	TIP42C	4	3	15	75	6	0.6		1.5	10	0.5	3		65
	120	KSD363		5	1	40	240	1	0.1		1	5	0.5		10	40
7	60	KSD568	KSB707	1	3	40	200	5	0.5		0.5					40
	80	KSD569	KSB708	1	3	40	200	5	0.5		0.5					40
}	100	KSC2334	KSA1010	5	3	40	200	5	0.5		0.6					40
	150	BU407						5	0.5		1	10	0.5	10		60
		BU407H		·				5	0.8		1	10	0.5	10		
	200	BU406						5	0.5		1	10	5	10		
		BU406H						5	0.8		1	10	. 5	10		60
		BU408						6	1.2		1 .	10	5	10		
10	60	MJE 3055T	MJE 2955T	4	4	20	100	4.	0.4		1.1	10	0.5	2		75

2-2. Darlington Transistors

2.2.1 TO-126 Type Transistors

1_	V	Device '	Туре		hfE	_			V _{CE(SA}	t) (V)			f	(MHz)		Pc
lc (A)	V _{CEO}	NPN	PNP	V _{CE}	lc (A)	MIN	MAX	Ic (A)	I _B	TYP	MAX	V _{CE} (V)	lc (A)	MIN	TYP	(W)
1.5	60	KSD985	KSB794	2	. 1	2K	зк	1A	0.001		1.5					10
	80	KSD986	KSB795	2	1	2K	зк	1A	0.001		1.5					10
3	60	KSD1693	KSB1150	2	1.5	2K	20K	1.5	0.0015	0.9	1.2					15
	100	KSD1692	KSB1149	2	1.5	2K	20K	1.5	0.0015	0.9	1.2					15
4	60	MJE800	MJE700	3	1.5	0.75K		1.5	0:03		2.5					40
		MJE801	MJE701	3	2	0.75K		2	0.04		2.8					
	80	MJE802	MJE702	3	1.5	0:75K		1.5	0.03		2.5					40
		MJE803	MJE703	3	2	0.75K		2	0.04		2.8		,			

2.2.2 TO-220 Type Transistors

lc	V				hFE				V _{CE(SA}	T) (V)			fT			Pc
(A)	V _{CEO}	NPN .	PNP ·	V _{CE} (V)	I _C (A)	MIN	MAX	V _{CE} (A)	lc (A)	TYP	MAX	V _{CE} (V)	Ic (A)	MIN	TYP	(W)
2	60	TIP110	TIP115	4	2	0.5K		2	0.008		2.5					50
	80	TIP111	TIP116	4	2	0.5K	,	2	0.008		2.5					50
	100	TIP112	TIP117	4	2	0.5K		2	0.008		2.5					50
5	60	TIP120	TIP125	3	3	1K		3	0.012		2					65
	80	TIP121	TIP126	3	3	1K		- 3	0.012		2					65
	100	TIP122	TIP127	3	3	1K		3	0.012		2					65
		KSD560	KSB601	2	3	2K	15K	3	0.003		1.5					30
8	60	TIP100	TIP105	4	3	1K	20K	3	0.006		2					80
	80	TIP101	TIP106	4	3	1K	20K	3.	0.006		2					80
	100	TIP102	TIP107	4	3	1K	20K	3	0.006		2					80
	150	BU807						5	0.05		1.5					60
	200	BU806						5	0.05		1.5					60
10	60	TIP140T	TIP145T	4	5	1K		5	0.01		2					80
	80	TIP141T	TIP146T	4	5	1K		5	0.01		2					80
	100	TIP142T	TIP147T	4	5	1K		5	0.01		2					80

2.2.3 TO-3P & TO-3P(F) Type Transistors

lc	V			h	FE			VcI	E(SAT)				fT			Pc	PKG
l C	V _{CEO}	NPN	PNP	V _{CE} (V)	I _C (A)	MIN	MAX	Ic (A)	I _B	ТҮР	MAX	V _{CE} (V)	I _C (A)	MIN	ТҮР		
10	60	TIP140F	TIP145F	4	5	1K		5	0.01		2					60	TO-3P(F)
		TIP140	TIP145	4	5	1K		5	0.01		2					125	TO-3P
	80	TIP141F	TIP142F	4	5	1K		5	0.01		2					60	TO-3P(F)
		TIP141	TIP142	4	5	1K		5	0,01		2					125	TO-3P
	100	TIP142F	TIP142F	4	5	1K		5	0.01		2					60	TO-3P(F)
		TIP142	TIP147	4	5	1K		5	0.01		2					125	TO-3P

2-3. Switching Transistors

V _{CEO}	lc	Device		h _{FE}			Va	E(SAT)	V۱		Swite	ching	Time	Pc		
*CEO	IC.	Device		IIFE			•	E(SAT)(v)		ton	t _{stg}	tf	10	Package	Structure
(V)	(A)	(NPN)	V _{CE} (V)	lc (A)	MIN	MAX	I _C (A)	I _B (A)	TYP	MAX		MAX (μS)	MAX (μS)	(W)		
400	0.5	KSC2752	5	0.05	20	80	0.3	0.06		1	1	2.5	1	10	TO-126	
	2	KSC2333	5	0.1	20	80	0.5	0.1		1	1	2.5	1	15	TO-220	
	5	KSC2518	5	0.5	20	80	2 '	0.4		1	1	2.5	0.7	40	TO-220	•
	7	KSC2335	5	1	20	80	3	0.6		1	1	2.5	1	40	TO-220	
	10	KSC2749	5	1	15	80	6	1.2		1	1	2.5	0.7	100	TO-3P	
	15	KSC2751	5	2 .	15	80	10	2	0.3	1	1	2.5	0.7	120	TO-3P	
500	3	KSC5020	5	0.3	15	50	1.5	0.3		1	0.5	3	0.3	40	TO-220	MBIT
	4	KSC5022	5	0.3	15	50	1.5	0.3		1	0.5	3	0.3	60	TO-3P	MBIT
	5	KSC5021	5	0.6	15	50	3	0.6		1	0.5	3	0.3	50	TO:220	MBIT
	7	KSC5023	5	0.6	15	50	3	0.6		1	0.5	3	0.3	80	TO-3P	MBIT
	10	KSC5024	5	8.0	15	50	4	0.8		1	0.5	3	0.3	90	TO-3P	MBIT
	15	KSC5025	5	1.2	15	50	6	1.2		1	0.5	3	0.3	100	TO-3P	MBIT
800	1.5	*KSC5026	5	0.1	10	40	0.75	0.15		· 2	0.5	3	0.3	40	TO-220	MBIT
	3	KSC5027	5	0.2	10	40	1.5	0.3		2	0.5	3	0.3	50	TO-220	MBIT
		*KSC5028	5	0.2	10	40	1.5	0.3		2	0.5	3	0.3	80	TO-3P	MBIT
	4.5	*KSC5029	5	0.3	10	40	2	0.4		2	0.5	3	0.3	90	TO-3P	MBIT
	6	*KSC5030	5	0.4	10	40	3	0.6		2	0.5	3	0.3	100	TO-3P	MBIT
	8	*KSC5031	5	0.6	10	40	4	0.8		2	0.5	3	0.3	140	TO-3P	MBIT

^{*:} Under Development.

2-4. Horizental Defelection Output Transistors

2.4.1 TO-3P Type Transistors

V _{CEO}	V	lc	Device		hre	na .		V	CE(SAT	^^		Swit	ching	Time	Pc	
*CEO	▼ CEO	ıc	Device		11FE				JE(SA I)(v)		ton	tstg	tf	-0	Comment
(V)	(V)	(Å)	(NPN)	V _{CE} (V)	lc (A)	MIN	MAX	lc (A)	I _B	ТҮР	MAX	MAX (μS)	MAX (μS)	MAX (μS)	(W)	4
1500	800	2.5	KSD5000	5	0.5	8		2	0.6		8			0.4	80	Built in Damper Diode
		3.5	KSD5001	5	0.5	8		2.5	0.8		8			0.4	80	Built in Damper Diode
-		,5	KSD5002	5	1	-8		4	0.8		5			0.4	120	Built in Damper Diode
		6	KSD5003	5	1	8		5	1		5			0.4	120	Built in Damper Diode
	, ,	2.5	KSD5004	5	0.5	8		2	0.6		8			0.4	80	·
		3.5	KSD5005	5	0.5	8		2.5	0.8		8			0.4	80	
		5	KSD5006	5	1	8		4	0.8		5			0.4	120	
		6	KSD5007	5	1	8		5	1		5			0.4	120	

2.4.2 TO-3P(F) Type Transistors

VCEO	Voca	lc	Device		hFE		•	V	CE(SAT	.///		Swit	ching	Time	Pc	
· CEO	• CEO	٠.	Device .		··rE	_		"	E(SAI	,, •,		ton	t _{stg}	tf		Comment
(V)	(V)	(A)	(NPN)	V _{CE} (V)	ic (A)	MIN	MAX	lc (A)	I _B (A)	ТҮР	MAX	MAX (μS)	MAX (μS)	MAX (μS)	(W)	
1500	800	2.5	KSD5010	5	0.5	8		2	0.6		8.			0.4	50	Built in Damper Diode
		3.5	KSD5011	5	0.5	8		2.5	8.0		8			0.4	50	Built in Damper Diode
		5	KSD5012	5	1	8		4	0.8		5			0.4	60	Built in Damper Diode
		6	KSD5013	5	1	8		5	1		5			0.4	60	Built in Damper Diode
	-	2.5	KSD5014	5	0.5	8		2	0.6		8			0.4	50	
		3.5	KSD5015	5	0.5	8		2.5	0.8		8			0.4	50	
		5	KSD5016	5	1	8		4	0.8		5			0.4	60	
		6	KSD5017	5	1	8		5	1		- 5			0.4	60	

3. QUICK REFERENCE TABLE (APPLICATION)

3.1 Audio Equipment

Application	Package on	SOT-23	TO-92	TO-92L	TO-126	TO-220
FM	RM AMP Mix, Conv Local Osc IF	KSC2223 KSC2223 KSC2223 KSC2715	KSC1674 KSC1674 KSC1674,KSC1675 KSC838,KSC1675	: :	1. 	
АМ	RF. Conv Osc	KSC1623 KSC2715 KSC2715	KSC945,KSC815 KSC1675,KSC945 KSC838 KSC1675,KSC945 KSC838		٠.	
Diff Amp	10W 20W 25W 30W 35W 40W 50W 60W 80W 100W	KSA812,KSC1623 KSA812,KSC1623 KSA812,KSC1623 KSA812,KSC1623 KSA812,KSC1623	KSA733, KSC945 KSA733, KSC945 KSA733, KSC945 KSA733, KSC945 KSA733, KSC945 KSA992, KSC1845 KSA992, KSC1845 KSA991, KSC1845 KSA992, KSC1845 KSA992, KSC1845 KSA992, KSC1845			
Pre Driver	 		KSA954,KSC2003 KSA954,KSC2003	KSA910,KSC2310 KSA910,KSC2310 KSA910,KSC2310 KSA910,KSC2310 KSA910,KSC2310 KSA910,KSC2310 KSA910,KSC2310	KSA1142,KSC2682 KSA1142,KSC2682 KSA1142,KSC2682	
Driver	3W 5W 10W 20W 25W 30W 40W 50W 60W 80W		KSA642,KSD227 KSA642,KSD227 KSA954,KSC2003 KSA954,KSC2003 KSA954,KSC2003 KSA954,KSC2003	KSA916,KSC2316 KSA916,KSC2316	KSA1220,KSC2690 KSA1220,KSC2690 KSA12204,KSC2690A	
Output	3W 5W 10W 20W 25W 30W 35W			KSA928A,KSC2328A	KSB772,KSD882 KSB744,KSD794	KSB834,KSD88 KSA614,KSD28 KSB596,KSD52 TIP41C,TIP42C TIP41C,TIP42C

3.2 Video Equipment

Application			Package	Color TV	B/W TV
Tuner		RF '	SOT-23	KSC2755	KSC2755
		ni	TO-92		KSC1393
	VHF	MIX	SOT-23	KSC2756	KSC2756
	VIII	IVIIA	TO-92	KSC1393,MPSH24	KSC1394,MPSH24
		UHF	SOT-23	KSC2757,KSC2759,MMBR5179	KSC2757,KSC2759,MMBR5179
		UHF	TO-92	KSC1730,MPS5179,MPSH10	KSC1730,MPS5179,MPSH10
		RF	DISK	KSC1070	KSC1070
		nr	SOT-23	KSC2758	KSC2758
	UHF	MIX	DISK	KSC1070	KSC1070
,	UHF	IVIIA	SOT-23	KSC2758	KSC2758
		UHF	SOT-23	KSC2757,KSC2759,MMBR5179	KSC2757,KSC2759,MMBR5179
		Unr	TO-92	KSC1730,MPS5179,MPSH10	KSC1730,MPS5179,MPSH10
Video	-		TO-92	KSA643,KSA733	KSA733,KSC945
Chroma	Outnut		TO-92L	KSC2330,KSC2340	KSC2330,KSC2340
	Output	•	TO-202	KSC1520A	KSC1520A
			TO-126	KSC2688	,
			TO-220	KSC1257	KSC1507
Vertical	osc		TO-92		KSC945,KSA733
Deflection	Driver		TO-92		KSA642,KSA643,KSD227,KSD261
	Driver		TO-92L	KSC2310,KSA910	
			TO-220	KSB546,KSD401,KSA940,KSC2073	KSD880,KSD288,KSA614,KSB834
	Output		TO-126	KSA1220A,KSC2690A	KSA1220A,KSC2690A,KSB772,KSD882
	Output		TO-202		KSC1096,KSA634
			TO-92L		KSC2328,KSA928A
Sound	Output		TO-126	KSA1220A,KSC2690A	
			TO-220	KSB546,KSD401,KSA940,KSC2073	
,			TO-202		
			TO-92L	KSC2383,KSA1013	KSC2328A,KSA928A
			TO-92		KSD261,KSB564,KSB1116,KSA643,KSD471,KSD1616
AGC			TO-92	KSC945,KSA733	KSC945,KSA733
Sync Separator			TO-92	KSC945,KSA733 .	KSC945,KSA733
Horizontal	OSC		TO-92	KSC945,KSA733	KSC945,KSA733
Deflection	Driver		TO-92		
			TO-92L	KSC2330,KSC2316;KSA916	
	Output		TO-3P		03 KSD5004,KSD5005,KSD5006,KSD5007
	·		TO-220		KSD362,KSD73
Series	Error		TO-92		KSA733,KSC945
Regurator	Amp		TO-92L	KSC2310,KSA910	
J	Driver	.	TO-92		KSA733,KSC945
	,		TO-92L	KSC2310,KSA910	
	Output			KSD560	KSD288,KSD880,KSB834,KSA614
	' '		TO-126		KSB772,KSD882
•			TO-202	,	KSC1096,KSA634
<u> </u>	Driver ,		TO-92	KSD471A,KSB564A,KSD261,KSA643	
Switching	Dilver .		10-92		

SOT-23 TYPE

V _{CEO}	20mA	30mÅ	50mA	0.1A	0.2A	0.3A	0.5A	0.6A	A8.0	10mA
12V			MMBR5179							
14V			KSC2734 KSC2759							
15V			KSC3120 KSC2757							
20V	KSC2223	KSC2756		BCW29-33						(2mA) KSK123
25V	KSC2758		KSC3125 MMBT5089 MMBC1009F1-5	MMBTH10,	MMBTA4124 MMBTA4126				KSA1298 KSC3265	
30V	KSC2755		KSC2715 MMBT5088	MMBTH24	MMBTA4123 MMBTA4125	MMBTA13 MMBTA14	KSA1182 KSC2859 MMBTA63 MMBTA64	MMBT2222		
3 <u>2</u> V				BCW60A-D BCW61A-D		,				
35V				MMBC1622D6-8						
40V					ММВТЗ903 ММВТЗ904 ММВТЗ906		MMBT6427	MMBT2222A MMBT2907 MMBT4401 MMBT4403		
45V			MMBA811C5-8	BCW69-72 BCW70G-K BCW71G-K	MMBT6429					
50V			MMBT5086 MMBT5087	KSA812 KSC1623 KSR1101-8 KSR2101-8 KSR1113/4 KSR2113/4	MMBT6428	.,				
60V			MMBT2484				MMBTA05 MMBTA55	MMBT2907A		
80V	,	,					MMBTA06 MMBTA56			
140V								MMBT5550		
150V							MMBT5401			
200V							MMBTA43 MMBTA93			
300V					· ·		MMBTA42 MMBTA92			

TO-92S, TO-92 & TO-92L TYPE (VCEO: 12V~60V)

V _{CEO}	12V	15V	20V	25V	30V	35V	40V	45V	50V	60V
20mA	KSK65 (2mA)	KSC1395	KSK161(10mA) KSK211(10mA) KSC1674 KSC2786	KSC1070	KSC1393 KSC1394				KSK117 (10mA) KSK30 (10mA)	
25mA			SS9016							
30mA			KSC1187 KSC1188		SS9011 KSC838 KSC2669					
50mA	MPS5179	KSC1730 SS9018		KSA542 KSC184 KSC2787 KSC388 KSC900 2N5089	2N5088 KSC1675			KSA640 KSC1222	2N5086 2N5087 2N5209 2N5210	,
O.1A		MPSH17		MPS5172 MPS6520 MPS6521 MPS6522 MPS6523 MPSH10 MPSH11	KSC839 KSC921 MPSH20 MPSH24		KSC1330 MPS6513 MPS6517 MPSA10 MPSA20 MPSA70 KSR1009-12 KSR2009-12 KSR2209-12	SS9014 SS9015	KSR1201-8 KSR1213/4 KSR2201-8 KSR2213/4 KSR1001-8 KSR2001-8 KSR20013/4	
0.15A							MPS4250		KSA1175 KSC2785 KSA733 KSC945	MPS4250A MPS4249
0.2A				2N4124 2N4126	2N4123 2N4125		2N3903 2N3904 2N3905 2N3906 MPS8097	KSA539 KSC815	2N6428 2N6428A	KSA545 KSC853
0.3A				KSC3488 KSA1378 KSA642 KSD227						KSA953 KSC2002
0.5A			MPSA12 MPSA62 KSA643 KSD261 SS9012 SS9013 KSA1150 KSC2710	MPS6560 MPS6562	MPSA13 MPSA14 MPSA63 MPSA64		2N6427 MPSA25 MPSA75		MPSA26 MPSA76	MPS8098 MPS8598 MPSA05 MPSA55 MPSA27 MPSA77
0.6A			MPS3706	MPS3702	MPS2222 MPS3703 MPS3704 MPS3705		2N4400 2N4401 2N4402 2N4403 MPS2222A MPS2907			MPS2907A
0.7A				KSB810 KSB811				KSA707 KSC1072		KSA708 KSC1008 KSA931 KSC2331

TO-92S, TO-92 & TO-92L TYPE (Continued)

V _{CEO}	12V	15 V	20V	25V	30V	35V	40V	45 V	50V	60V
0.8A										
1A				KSB564A KSB811 MPS6601 MPS6651	KSD1021 KSD471A		MPS6602		KSB1116 KSD1616	KSB116A KSD1616A
1.5A				SS8050 SS8550						
2A	(10V) KSC2500				KSA928A KSC2328A					

TO-92S, TO-92 & TO-92L Type (V_{CEO}: 80V~400V)

V _{CEO}	80V	100V	120V	140V	150V	160V	200V	250V	300V	350V	400V
20mA											
25mA					-		1				
30mA											
50mA			KSA992 KSC1845 KSA1174 KSC2874		KSA910 KSC2310						
0.1mA									KSC1506 KSC2330	KSC2340	
0.15A			MPSL01								
U. 15A			MIPSLUT								
0.2A											
0.3A	KSA954 KSC2003									MPSA45	MPSA44
0.5A	MPS8099 MPS8599 MPSA06 MPSA56						MPSA43 MPSA93	2N6515 2N6518		2N6517 2N6520	
0.6A		MPSL51	2N5400	2N5550	2N5401	2N5551				,	

TO-92S, TO-92 & TO-92L Type (continued)

80V	100V	120V	140V	150V	160V	200V	250V	300V	350V	400V
			KSC1009	KSA709						
		1								
		KSA916 KSC2316								
					KSA1013 KSC2383					
								,		
	1.7									
			KSA916 KSC2316	KSA916 KSC2316	KSA916 KSC2316	KSA916 KSC2316 KSC2316 KSA1013 KSC2383	KSC1009 KSA709 KSA916 KSC2316 KSA1013 KSC2383	KSC1009 KSA709 KSA916 KSC2316 KSA1013 KSC2383	KSC1009 KSA709 KSA916 KSC2316 KSA1013 KSC2383	KSA916 KSC2316 KSC2383

TO-126 & TO-202 TYPE (V_{CEO}: 25V~400V)

V _{CEC}	25V	30V	40V	45V	60V	80V	100V	120V	160V	180V	250V	300V	400V
0.1A					,					KSC2682 KSA1142			
0.2A	.,									,	KSC1520	KSC2688 KSC1520A	
0.5A												MJE340 MJE350	KSC2752
1.2A									KSC2690A KSA1220A				
1.5A			٠.			KSD986 KSB795							
2A		KSC1096 KSA634		KSC1098 KSA636		·							(
ЗА	-			KSB744	KSD794A KSB744A MEJ171 MJE181 KSD1693 KSB1150	MJE182							
4A					MJE701 MJE800	MJE702 MJE703 MJE802 MJE803				1 _p e			
5A	MJE200 MJE210				KSD1691 KSB1151								

TO-220 TYPE

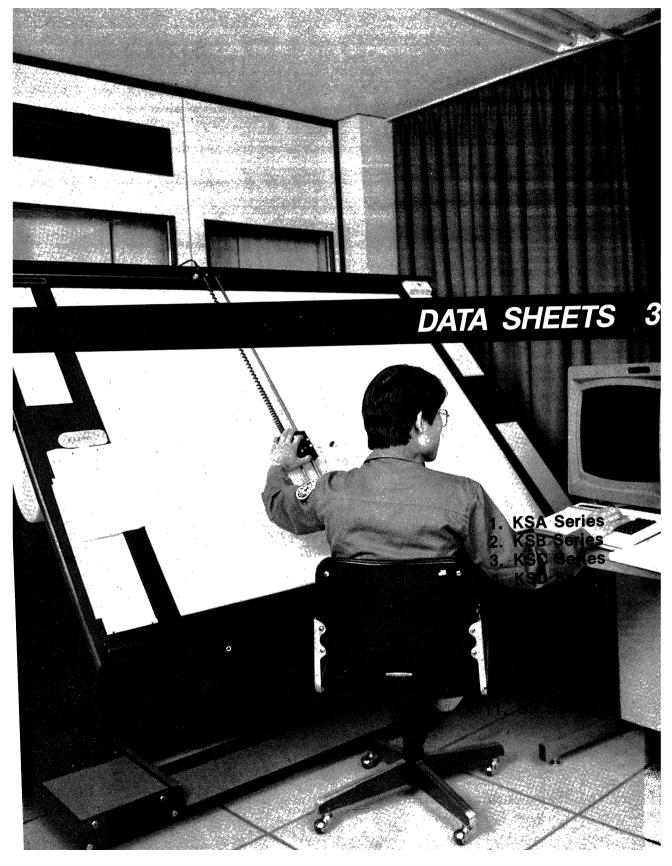
V _{CEO}	30V	40V	55V	60V	70V	80V	100V	120V	150V	200V	250V	300V	350V	400V	500V	800V
0.2												KSC1507				
1		TIP29 TIP30		TIP29A TIP30A		TIP29B TIP30B	TIP29C TIP30C				TIP47	TIP48	TIP49	TIP50		
1.5							,		KSC2073 KSA940		,					*KSC5026
2A				TIP110 TIP115		TIP111 TIP116	T!P112 TIP117		KSD401 KSB546					KSC2333		
3A	KSC1173 KSA473		KSA614			TIP31B TIP32B	TIP31C TIP32C								KSC5020	*KSC5027
4A				KSC2233		KSD526 KSB596										
5A				KSD73 TIP120 TIP125	KSD362	TIP121 TIP126	KSC2517 TIP122 TIP127 KSB601 KSD560			•				KSC2518	*KSC5021	
6		TIP41 Tlp42		TIP41A TIP42A		TIP41B TIP42B	TIP41C TIP42C	KSD363						KSC2335		
7		·		KSD568 KSB707			KSC2334 KSA1010		BU407 BU407H	BU406 BU406H BU408				١		
8				TIP100 TIP105	,		TIP102 TIP107		BU807	BU806					·	,
10				MJE3055T MJE2955T TIP140T TIP145T			TIP142T TIP147T	,						,		

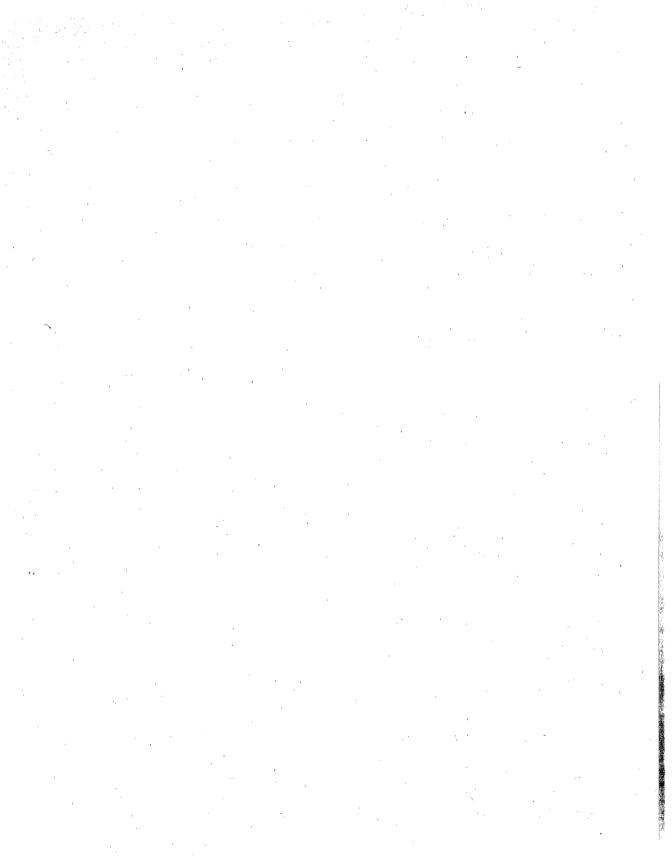
TO-3P & TO-3P(F) TYPE

V _{CEO}	2.5A	3A	3.5A	4A '	4.5A	5 A	6A -	7A	8A	10A	15A
400										KSC2749	KSC2751
500				*KSC5022				*KSC5023		*KSC5024	*KSC5025
	KSD5000 KSD5004 KSD5010 KSD5014		KSD5000 KSD5005 KSD5011 KSD5012			KSD5006 KSD5012 KSD5016	*KSC5030 KSD5003 KSD5007 KSD5013 KSD5017		*KSC5031		

^{*} Under Development

NOTES



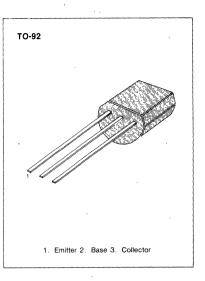


LOW FREQUENCY AMPLIFIER

- Complement to KSC815
- Collector-Base Voltage V_{CBO} = −60V
- Collector Dissipation P_C = 400mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

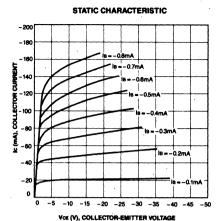
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Junction Temperature Storage Temperature	VCBO VCEO VEBO IC PC Tj	- 60 - 45 - 5 - 200 400 150 - 55 ~ 150	∨ ∨ ∨ mA mW °C °C



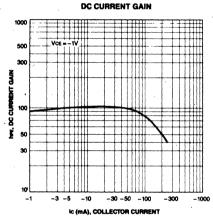
ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_C = -100 \mu A$, $I_E = 0$	- 60	٠.		v
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -10 \text{mA}, I_{B} = 0$	- 45			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = -10 \mu A$, $I_C = 0$	- 5			V
Collector Cut-off Current	I _{CBO}	$V_{CB} = -45V, I_{E} = 0$			- 100	nA
Emitter Cut-off Current	I _{EBO}	$V_{EB} = -3V, I_C = 0$			- 100	nA
DC Current Gain	h _{FE}	$V_{CE} = -1V, I_{C} = -50mA$	40		240	
Base-Emitter On Voltage	V _{BE} (on)	$V_{CE} = -1V, I_{C} = -10mA$	- 0.60	- 0.65	- 0.90	V
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = -150 \text{mA}, I_B = -15 \text{mA}$		- 0.25	- 0.5	. V
Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_C = -150 \text{mA}, I_B = -15 \text{mA}$		- 0.9	- 1.2	V
L 1	ì			ļ		l .

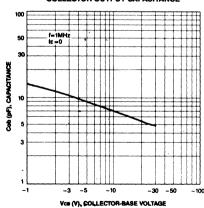
Classification	R	0	Y
h _{FE}	40-80	70-140	120-240

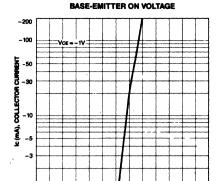




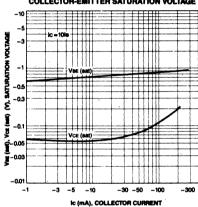


COLLECTOR OUTPUT CAPACITANCE





VME (V), BASE-EMITTER VOLTAGE BASE-EMITTER SATURATION VOLTAGE COLLECTOR-EMITTER SATURATION VOLTAGE

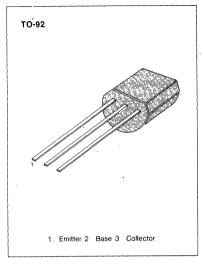


LOW FREQUENCY AMPLIFIER

- Collector-Base Voltage V_{CBO} = −30V
- Low Collector-Emitter Saturation Voltage V_{CE} (sat) = −0.15V (TYP)
- Complement to KSC184

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

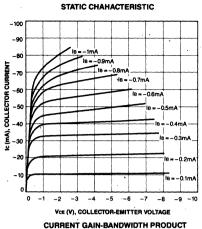
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	- 30	٧
Collector-Emitter Voltage	V _{CEO}	- 25	V
Emitter-Base Voltage	V _{EBO}	- 5	V
Collector Current	lc	- 50	mA
Collector Dissipation	Pc	250	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55 ~ 150	°C

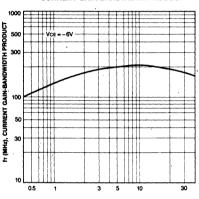


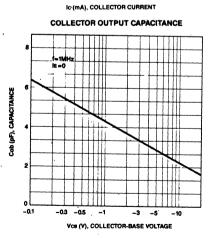
ELECTRICAL CHARACTERISTICS (Ta=25°C)

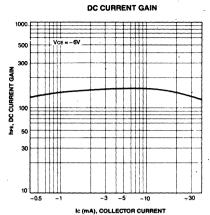
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage Collector-Emitter Breakdown Voltage Emitter-Base Breakdown Voltage Collector Cut-off Current Emitter Cut-off Current DC Current Gain Collector-Emitter Saturation Voltage Base-Emitter On Voltage Current Gain-Bandwidth Product Output Capacitance	BV _{CBO} BV _{CEO} BV _{EBO} ICBO IEBO hFE V _{CE} (sat) V _{BE} (on) f _T COb	$\begin{split} I_C &= -100 \mu A, \ I_E = 0 \\ I_C &= -10 m A, \ I_B = 0 \\ I_E &= -10 \mu A, \ I_C = 0 \\ V_{CB} &= -25 V, \ I_E = 0 \\ V_{CE} &= -6 V, \ I_C = -1 m A \\ I_C &= -6 V, \ I_C = -1 m A \\ V_{CE} &= -6 V, \ I_C = -1 m A \\ V_{CB} &= -6 V, \$	- 30 25 5	- 0.15 - 0.65 100 2.5	- 100 - 100 400 - 0.3 - 1.0	V V nA nA V V MHz pF

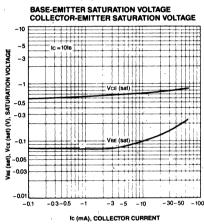
Classification	R	0	Y	G
h _{FE}	40-80	70-140	120-240	200-400









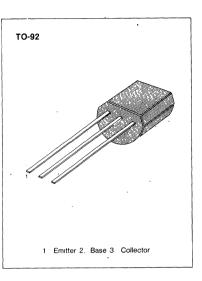


LOW FREQUENCY AMPLIFIER

- Complement to KSC853
- Collector-Base Voltage V_{CBO} = −70V
- Collector Dissipation Pc = 400mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

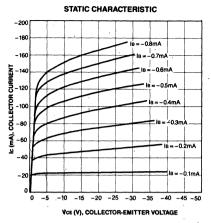
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Junction Temperature Storage Temperature	V _{CBO} V _{CEO} V _{EBO} I _C P _C Tj Tstg	- 70 - 60 - 5 - 200 400 150 - 55 ~ 150	V V V mA mW °C °C

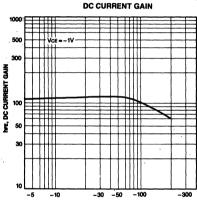


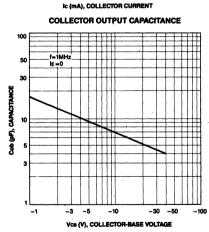
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

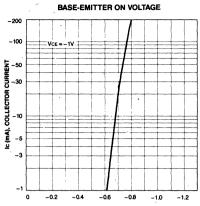
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
. Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = -100 \mu A, I_{E} = 0$	- 70			٧
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{\rm C} = -10 \text{mA}, I_{\rm B} = 0$	- 60	,		V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = -10 \mu A, I_C = 0$	-5			V
Collector Cut-off Current .	I _{CBO}	$V_{CB} = -45V, I_E = 0$			100	nA
Emitter Cut-off Current	I _{EBO}	$V_{EB} = -3V$, $I_{C} = 0$			- 100	nA
DC Current Gain	h _{FE}	$V_{CE} = -1V$, $I_{C} = -50 \text{mA}$	40		400	
Base-Emitter On Voltage	V _{BE} (on)	$V_{CE} = -1V$, $I_{C} = -10mA$	-0.60	- 0.65	- 0.90	V
Collector-Emitter Saturation Voltage	V _{CF} (sat)	$I_C = -150 \text{mA}, I_B = -15 \text{mA}$		- 0.25	- 0.5	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_C = -150 \text{mA}, I_B = -15 \text{mA}$		- 0.9	- 1.2	· V

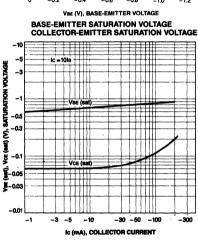
Classification	R	0	Υ	G
h _{FE}	40-80	70-140	120-240	200-400









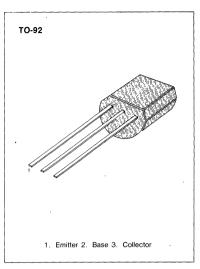


LOW FREQUENCY LOW NOISE AMPLIFIER

- Complement to KSC1222
- Collector-Base Voltage V_{CBO} = −50V
- Low Noise Level NL=40mV (Max)

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

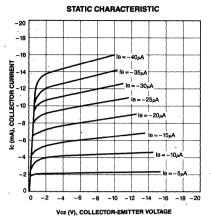
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	- 50	٧
Collector-Emitter Voltage Emitter-Base Voltage	V_{CEO} . V_{EBO}	– 45 – 5	V
Collector Current	l _c	- 50	mA
Collector Dissipation Junction Temperature	P _C ·	250 150	mW °C
Storage Temperature	Tstg	−55 ~ 150	°C

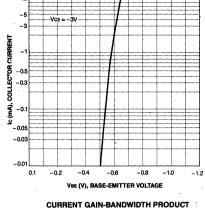


ELECTRICAL CHARACTERISTICS (Ta=25°C)

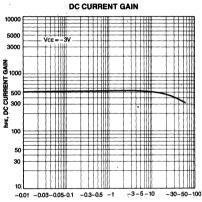
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage Collector-Emitter Breakdown Voltage Emitter-Base Breakdown Voltage Collector Cut-off Current Emitter Cut-off Current DC Current Gain Collector-Emitter Saturation Voltage Base-Emitter On Voltage Collector Gain-Bandwidth Product Output Capacitance Noise Level	BV _{CBO} BV _{CEO} BV _{EBO} I _{CBO} I _{CBO} I _{EBO} N _{FE} V _{CE} (sat) V _{BE} (on) f _T Cob	$\begin{split} &I_C = -100\mu\text{A},\ I_E = 0\\ &I_C = -10m\text{A},\ I_B = 0\\ &I_E = -10\mu\text{A},\ I_C = 0\\ &V_{CB} = -40V,\ I_E = 0\\ &V_{CB} = -3V,\ I_C = -0.5\text{mA}\\ &I_C = -20\text{mA},\ I_B = -2\text{mA}\\ &V_{CE} = -3V,\ I_C = -0.5\text{mA}\\ &V_{CE} = -3V,\ I_C = -1\text{mA}\\ &V_{CB} = -6V,\ I_E = 0,\ f = 1\text{MHz}\\ &V_{CC} = -20V,\ I_C = -0.1\text{mA}\\ &R_S = 25K\Omega,\ f = 1\text{KHz}\\ &A_V = 80\text{dB} \end{split}$	-50 -45 -5	- 0.2 - 0.63 100 3.0 27	- 0.1 - 0.1 1000 - 0.3 - 0.70	V V μA μA V· V MHz pF mV

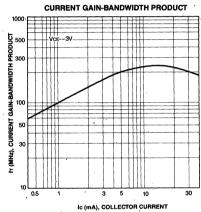
Classification	Υ	G	L	V
h _{FE}	120-240	200-400	350-700	600-1000

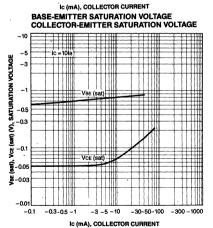


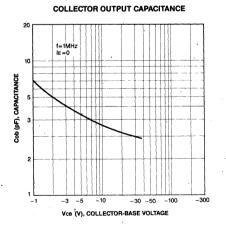


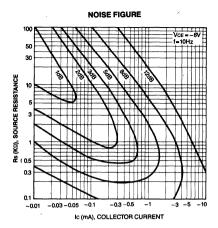
BASE-EMITTER ON VOLTAGE

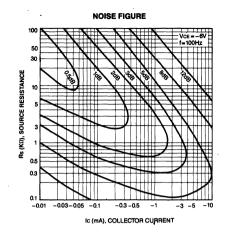


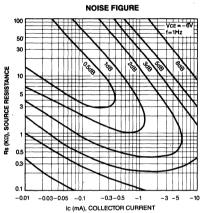












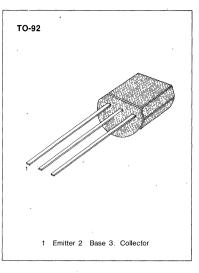
LOW FREQUENCY POWER AMPLIFIER

- Complement to KSD227
- Collector Dissipation Pc = 400mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current (DC) Collector Current (pulse) Collector Dissipation Junction Temperature Storage Temperature	V _{CBO} V _{CEO} V _{EBO} I _C (DC) I _C (pulse)* P _C Tj Tstg	- 30 - 25 - 5 - 300 - 500 400 150 - 55~150	V V V mA mA mW °C °C

^{*} PW \leq 10ms, duty cycle \leq 50%

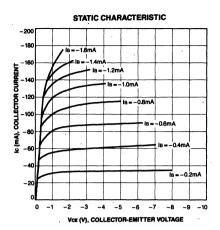


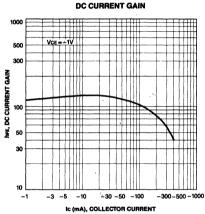
ELECTRICAL CHARACTERISTICS (Ta=25°C)

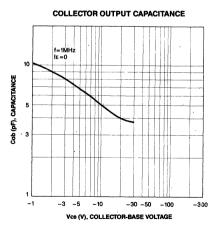
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{\rm C} = -100 \mu A$, $I_{\rm E} = 0$	- 30			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -10 \text{mA}, I_{B} = 0$	- 25			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_{\rm E} = -10 \mu A$, $I_{\rm C} = 0$	- 5			V
Collector Cut-off Current	I _{CBO}	$V_{CB} = -25V$, $I_{E} = 0$			- 100	nA
Emitter Cut-off Current	I _{EBO} .	$V_{EB} = -3V$, $I_{C} = 0$			- 100	nA
DC Current Gain	h _{FF}	$V_{CE} = -1V$, $I_{C} = -50 \text{mA}^*$	70		400	
Collector-Emitter Saturation Voltage	V _{CE} (sat).	$I_C = -300 \text{mA}, I_B = -30 \text{mA}^*$,	- 0.35	- 0.6	V

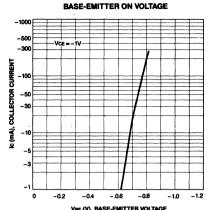
^{*} Pulse Test: PW \leq 350 μ s, duty cycle \leq 2%

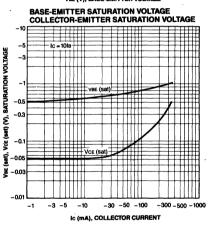
Classification	0	Y	G .
h _{FE}	70-140	120-240	200-400











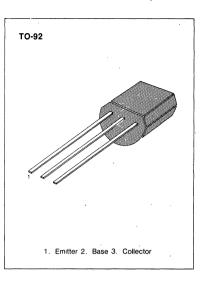
LOW FREQUENCY POWER AMPLIFIER

- Complement to KSD261
- Collector Dissipation Pc = 500mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current (DC) Collector Current (pulse)* Collector Dissipaiton	V _{CBO} V _{CEO} V _{EBO} I _C (DC) I _C (pulse)*	- 40 - 20 - 5 - 500 - 700 500	V V MA mA
Junction Temperature Storage Temperature	Tj Tstg	150 -55~150	°C

^{*} PW ≤ 10mS, duty Cycle ≤ 50%.



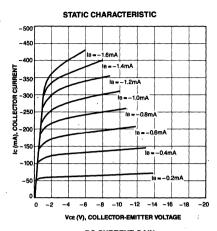
ELECTRICAL CHARÁCTERISTICS (Ta=25°C)

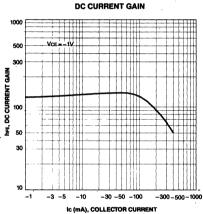
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_C = -100 \mu A$, $I_E = 0$	- 40			V.
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -10 \text{mA}, I_{B} = 0$	- 20			٧
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = -100 \mu A$, $I_C = 0$	-5			V
Collector Cut-off Current	I _{CBO}	$V_{CB} = -25V, I_E = 0$	× .		- 200	nΑ
Emitter Cut-off Current	I _{EBO}	$V_{EB} = -3V, I_{C} = 0$. – 200	nΑ
DC Current Gain	h _{FE}	$V_{CE} = -1V, I_{C} = -100 \text{mA}^*$	40		400	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = -500 \text{mA}, I_B = -50 \text{mA}^{\dagger}$		-0.3	-0.4	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_C = -500 \text{mA}, I_B = -50 \text{mA}^*$		- 1.0	- 1.3	٧

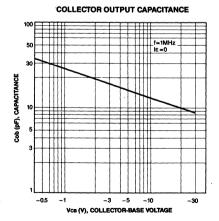
^{*} Pulse Test: PW = 350μ s, duty cycle = 2%

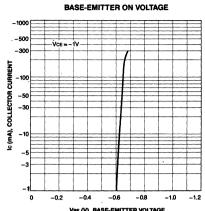
hFE CLASSIFICATION

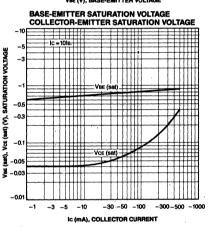
Classification	R	0	Υ	G
h _{FE}	40-80	70-140	120-240	200-400









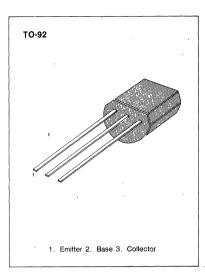


LOW FREQUENCY POWER AMPLIFIER

- Complement to KSC1072
- Collector-Base Voltage V_{CBO} = −60V
- Collector Dissipation Pc = 800mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	- 60	· V
Collector-Emitter Voltage	V _{CEO}	45	V
Emitter-Base Voltage	V _{EBO}	-5	V
Collector Current	l _c	– 700	mΑ
Collector Dissipation	Pc	800	mW
Junction Temperature	Ti	150	°C
Storage Temperature	Tstg	-55 ~ 150	°C

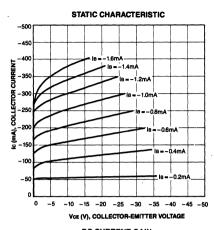


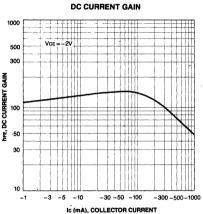
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

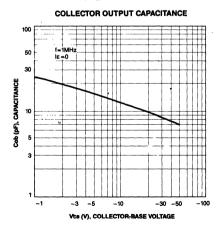
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage Collector-Emitter Breakdown Voltage Emitter-Base Breakdown Voltage Collector Cut-off Current Emitter Cut-off Current DC Current Gain Collector-Emitter Saturation Voltage Base-Emitter Saturation Voltage Output Capacitance	BVcBO BVcEO BVEBO ICBO IEBO hFE VCE(sat) VBE (sat)	$\begin{split} I_C &= -100 \mu A, \ I_E = 0 \\ I_C &= -10 m A, \ I_B = 0 \\ I_E &= -100 \mu A, \ I_C = 0 \\ V_{CB} &= -40V, \ I_E = 0 \\ V_{CB} &= -3V, \ I_C = 0 \\ V_{CE} &= -2V, \ I_C = -50 m A^* \\ I_C &= -500 m A, I_B = -50 m A^* \\ V_{CB} &= -10V, \ I_E = 0 \\ f &= 1 MHz \end{split}$	-60 -45 -5 40 -0.7	-0.3 -0.9 13	-0.1 -0.1 240 -0.7 -1.1	V V ν μΑ μΑ V PF

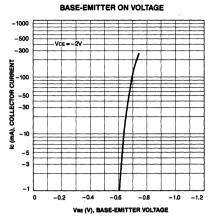
^{*} Pulse Test: PW≤350μs, duty cycle≤2%

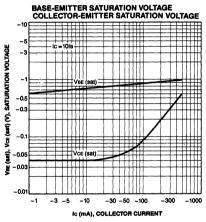
Classification	R	0	Y
h _{FE}	40-80	70-140	120-240









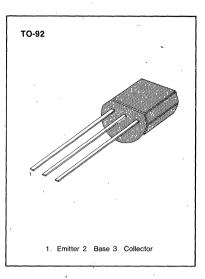


LOW FREQUENCY AMPLIFIER MEDIUM SPEED SWITCHING

- Complement to KSC1008
- Collector-Base Voltage V_{CBO} = −80V
- Collector Dissipation P_c =800mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	- 80	. V
Collector-Emitter Voltage	, V _{CEO}	- 60	V
Emitter-Base Voltage	V _{EBO}	-8	V
Collector Current	l _C	- 700	mA
Collector Dissipation	Pc	800	mW
Junction Temperature	Tj	150	.°C
Storage Temperature	Tstg	−55 ~ 150	°C



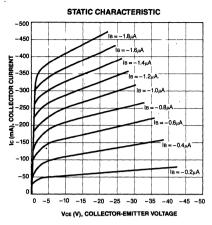
ELECTRICAL CHARACTERISTICS (Ta=25°C)

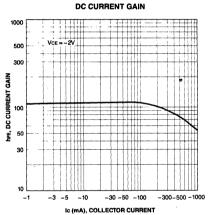
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage Collector-Emitter Breakdown Voltage Emitter-Base Breakdown Voltage Collector Cut-off Current Emitter Cut-off Current DC Current Gain Collector-Emitter Saturation Voltage Base-Emitter Saturation Voltage Current-Gain-Bandwidth Product Output Capacitance	BV _{CBO} BV _{CEO} BV _{EBO} I _{CBO} I _{EBO} h _{FE} V _{CE} (sat) V _{BE} (sat) f _T Cob	$\begin{split} &I_C = -100\mu\text{A},\ I_E = 0\\ &I_C = -10\text{mA},\ I_B = 0\\ &I_E = -100\mu\text{A},\ I_C = 0\\ &V_{CB} = -60\text{V},\ I_E = 0\\ &V_{EB} = -5\text{V},\ I_C = 0\\ &V_{CE} = -2\text{V},\ I_C = -50\text{mA}^*\\ &I_C = -500\text{mA},\ I_C = -50\text{mA}\\ &V_{CE} = -10\text{V},\ I_C = -50\text{mA}\\ &V_{CB} = -10\text{V},\ I_E = 0\\ &f = 1\text{MHz} \end{split}$	- 80 - 60 - 8 40	-0.3 -0.9 50 13	-0.1 -0.1 240 -0.7 1.1	V V μA μA V V MHz pF

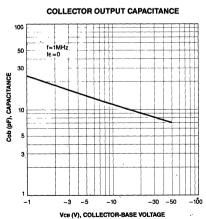
^{*} Pulse Test: PW ≤350μs, duty cycle ≤ 2%

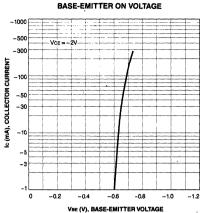
hFE CLASSIFICATION

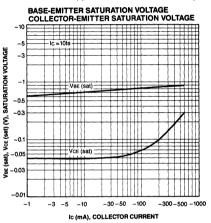
Classification	R	0	· Y .
h _{FE}	40-80	70-140	120-240









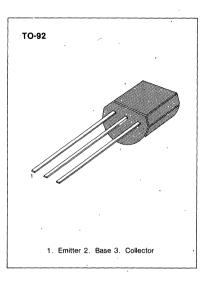


HIGH VOLTAGE AMPLIFIER

- Collector-Base Voltage V_{CBO} = −160V
- Collector Dissipation P_c = 800mW
- Complement to KSC1009

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	- 160	٧
Collector-Emitter Voltage	V _{CEO}	150	V
Emitter-Base Voltage	V _{EBO}	-8	٧
Collector Current	lc	- 700	- mA
Collector Dissipation	Pc	800	mW
Junction Temperature	Ti	150	°C
Storage Temperature	Tstg	−55 ~ 150	•C

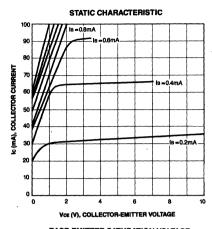


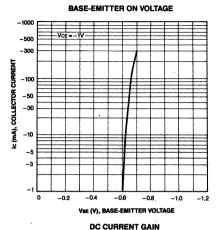
ELECTRICAL CHARACTERISTICS (Ta=25°C)

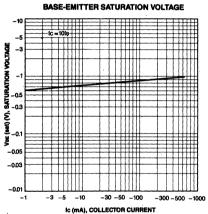
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage Collector-Emitter Breakdown Voltage Emitter-Base Breakdown Voltage Collector Cut-off Current Emitter Cut-off Current DC Current Gain Collector-Emitter Saturation Voltage Base-Emitter Saturation Voltage Current Gain-Bandwidth Product Output Capacitance	BV _{CBO} BV _{CEO} BV _{EBO} ICBO ICBO IFFE VCE(sat) VBE (sat) f _T COb	$\begin{split} &I_C = -100\mu\text{A}, \ I_E = 0 \\ &I_C = -100\text{M}, \ I_B = 0 \\ &I_E = -100\mu\text{A}, \ I_C = 0 \\ &V_{CB} = -100\text{V}, \ I_E = 0 \\ &V_{CB} = -5\text{V}, \ I_C = 0 \\ &V_{CE} = -2\text{V}, \ I_C = -50\text{mA}^* \\ &I_C = -200\text{mA}, \ I_B = -20\text{mA}^* \\ &I_C = -200\text{mA}, \ I_C = -50\text{mA} \\ &V_{CB} = -10\text{V}, \ I_C = -50\text{mA} \\ &V_{CB} = -10\text{V}, \ I_E = 0 \\ &I_C = -10\text{MHz} \end{split}$	-160 -150 -8	- 0.3 - 0.9 50	-0.1 -0.1 240 -0.4 -1.0	V V V μA μA V V MHz pF

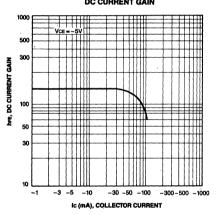
^{*} pulse measured PW≤350μs, duty cycle≤2%

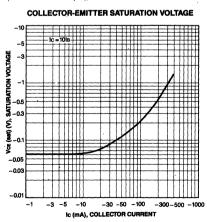
Classification	Ο,	/ Y	G
h _{FE}	70-140	120-240	200-400

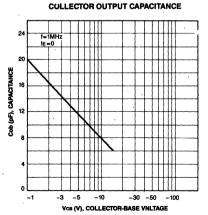








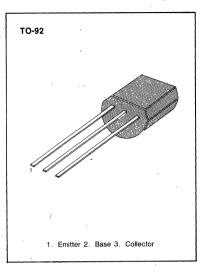




- Complement to KSC945
- Collector-Base Voltage V_{CBO} = −60V

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-60	٧
Collector-Emitter Voltage Emitter-Base Voltage	V _{CEO} V _{EBO}	50 5	V
Collector Current Collector Dissipation	I _C P _C	- 150 250	mA mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55 ~ 150	°C

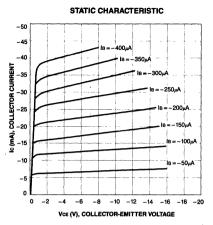


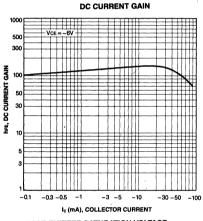
ELECTRICAL CHARACTERISTICS (Ta=25°C)

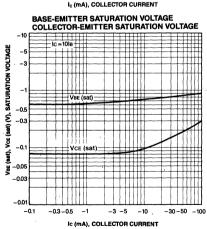
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage Collector-Emitter Breakdown Voltage Emitter-Base Breakdown Voltage Collector Cut-off Current Emitter Cut-off Current DC Current Gain Collector-Emitter Saturation Voltage Base-Emitter On Voltage Current-Gain-Bandwidth Product Output Capacitance Noise Figure	BVCBO BVCBO BVEBO ICBO ICBO ICBO IFE VCE(Sat) VBE (ON) IT COB	$I_C = -100\mu A, I_E = 0$ $I_C = -10mA, I_B = 0$ $I_E = -10\mu A, I_C = 0$ $V_{CB} = -60V, I_E = 0$ $V_{CE} = -6V, I_C = -1mA$ $I_C = -100mA, I_B = -10mA$ $V_{CE} = -6V, I_C = -1mA$ $V_{CE} = -6V, I_C = -10mA$ $V_{CB} = -10V, I_E = 0$ $I_C = -10MA$	-60 -50 -5 -5 40 -0.50	-0.18 -0.62 180 2.8 6.0	- 0.1 - 0.1 700 - 0.3 - 0.80	V V V μA μA V V MHz pF

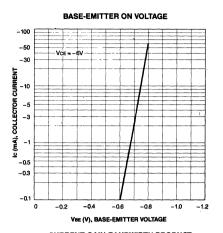
Classification	R	0	Υ	G	L
h _{FE}	40-80	70-140	120-240	200-400	350-700

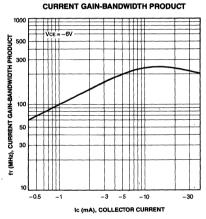


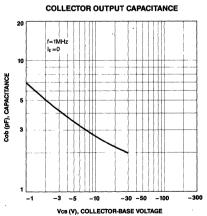








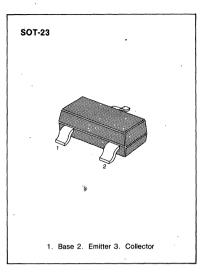




- Complement to KSC1623
- Collector-Base Voltage V_{CBO} = −60V

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

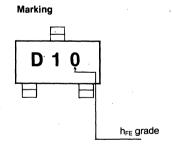
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Junction Temperature Storage Temperature	V _{CBO} V _{CEO} V _{EBO} I _C P _C Tj Tstq	-60 -50 -5 -100 150 150 -55∼150	V V MA mW °C

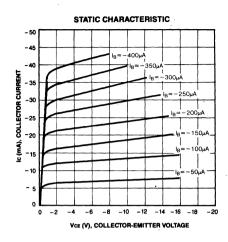


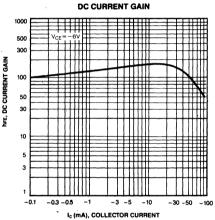
ELECTRICAL CHARACTERISTICS (Ta=25°C)

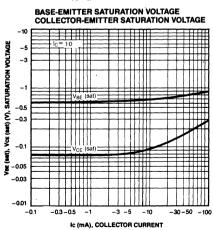
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector Cutoff Current	I _{CBO}	V _{CB} =-60V, I _E =0			-0.1	μΑ
Emitter Cutoff Current	I _{EBO}	$V_{EB} = -5V, I_{C} = 0$			-0.1	μA
DC Current Gain	h _{FE}	$V_{CE} = -6V, I_{C} = -1mA$	90	200	600	·
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -100 \text{mA}, I_{B} = -10 \text{mA}$		-0.18	-0.3	V
Base-Emitter On Voltage	V _{BE} (on)	$I_{C} = -1 \text{ mA}, V_{CE} = -6 \text{ V}$	-0.55	-0.62	-0.65	V
Current Gain-Bandwidth Product	f _T	$I_{C} = -10 \text{mA}, V_{CE} = -6 \text{V}$. 180		MHz
Output Capacitance	Cob	$V_{CB} = -10V, I_{E} = 0$,	4.5		pF
·		f=1MHz				

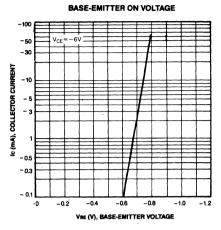
Classification	0	Ÿ	G	L
h _{FE}	90-180	135-270	200-400	300-600

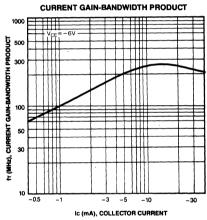


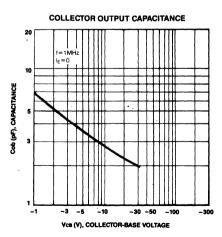










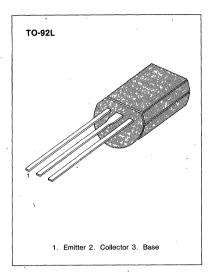


DRIVER STAGE AUDIO AMPLIFIER HIGH VOLTAGE SWITCHING APPLICATIONS

- Complement to KSC2310
- Collector-Emitter Voltage V_{CEO} =-150V
- Output Capacitance: Cob=5pF (MAX)

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

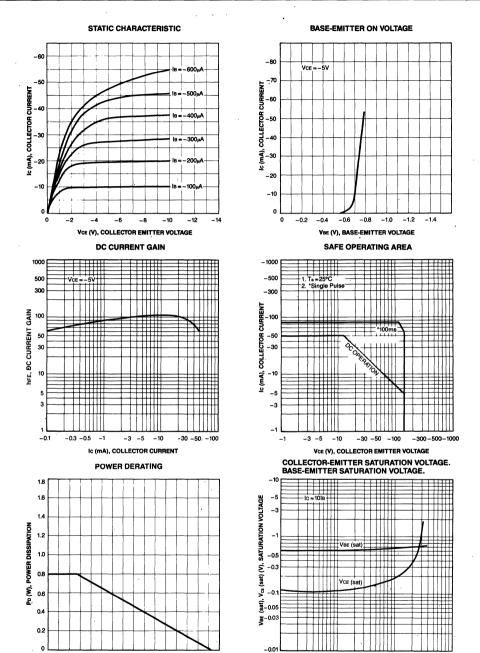
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	- 150	V
Collector-Emitter Voltage	V _{CEO}	- 150	V
Emitter-Base Voltage	V _{EBO}	-5	V
Collector Current	l _c .	- 50	mA
Collector Dissipation	Pc	800	mW
Junction Temperature	Ti	. 150	°C
Storage Temperature	Tstg	-55~+150	°C



ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage Collector-Emitter Breakdown Voltage Emitter-Base Breakdown Voltage Collector Cutoff Current DC Current Gain Collector-Emitter Saturation Voltage Current-Gain-Bandwidth Product Output Capacitance	BV _{CBO} BV _{EBO} I _{CBO} I _{CBO} h _{FE} V _{CE} (sat) f _T Cob	$\begin{split} &I_C = -100\mu\text{A},\ I_E = 0 \\ &I_C = -5\text{mA},\ I_B = 0 \\ &I_E = -10\mu\text{A},\ I_E = 0 \\ &V_{CB} = -150\text{V},\ I_E = 0 \\ &V_{CE} = -5\text{V},\ I_C = -10\text{mA} \\ &I_C = -10\text{mA},\ I_B = -1\text{mA} \\ &V_{CE} = -30\text{V},\ I_C = -10\text{mA} \\ &V_{CB} = 10\text{V},\ I_E = 0, \\ &f = 1\text{MHz} \end{split}$	- 150 - 150 - 5 - 40	100	- 100 240 - 0.8 5.0	V V V nA V MHz pF

Classification	R	. 0	Y
ħ _{FE}	40-80	70-140	120-240



80 100

Ta (°C), AMBIENT TEMPERATURE

140 160

-0.1

-0.3 -0.5

-3 -5

Ic (mA), COLLECTOR CURRENT

-30-50 -100

60

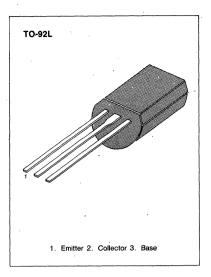
0 20

AUDIO POWER AMPLIFIER

- Driver Stage Amplifier
- Complement to KSC2316

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

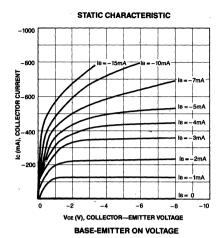
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	- 120	V.
Collector-Emitter Voltage	V _{CEO}	- 120	V
Emitter-Base Voltage	V _{EBO}	-5	V
Collector Current	· Ic	- 800	mA
Collector Dissipation	Pc	900	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55~+150	°C

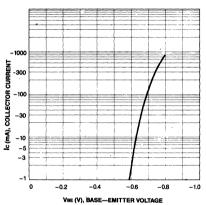


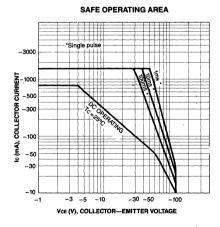
ELECTRICAL CHARACTERISTICS (Ta=25°C)

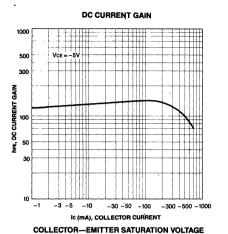
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C = -1mA, I _E = 0	- 120			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -10 \text{mA}, I_{B} = 0$	- 120			V.
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = -1mA$, $I_C = 0$	-5	•		V
Collector Cutoff Current	· I _{CBO}	$V_{CB} = -120V, I_E = 0$			0.1	μΑ
DC Current Gain	h _{FE1}	$V_{CE} = -5V, I_{C} = -10mA$	60			
	h _{FE2}	$V_{CE} = -5V$, $I_{C} = -100 \text{mA}$	80		240	,
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = -500 \text{mA}, I_B = -50 \text{mA}$			-1	V
Current-Gain Bandwidth Product	f⊤	$V_{CE} = -5V, I_{C} = -100 \text{mA}$		120		MHz
Output Capacitance	Cob	$V_{CB} = -10V, I_{E} = 0$			40	pF
	,	f=1MHz				,

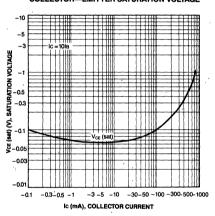
Classification	0	Y
h _{FE(2)}	80-160	120-240

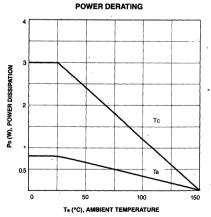










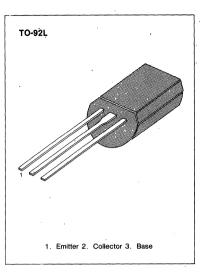


AUDIO POWER AMPLIFIER

- Complement of KSC2328A
- Collector Dissipation Pc=1 Watt
- 3 Watt Output Application

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

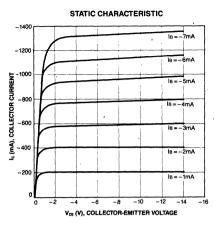
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	- 30	٧
Collector-Emitter Voltage	V_{CEO}	- 30	V
Emitter-Base Voltage	V _{EBO}	-5	V
Collector Current	Ic	-2	Α
Collector Dissipation	P _C	1	w
Junction Temperature	Ti	150	°C
Storage Temperature	Tstg	-55~+150	°C

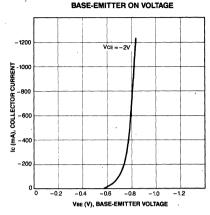


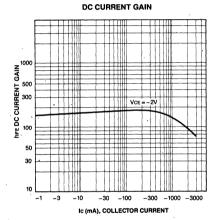
ELECTRICAL CHARACTERISTICS (Ta=25°C)

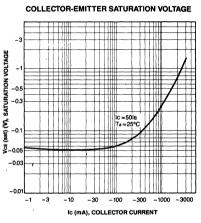
Characteristic	Symbol	Test Conditions	Min	, Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = -100 \mu A, I_{E} = 0$	- 30			v
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -10 \text{mA}, I_{B} = 0$	-30			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_{\rm E} = -1 \text{mA}, I_{\rm C} = 0$	-5		1	V
Collector Cutoff Current	I _{CBO}	$V_{CB} = -30V, I_{E} = 0$			- 100	nA
Emitter Cutoff Current	I _{EBO}	$V_{EB} = -5V, I_{C} = 0$			- 100	nA
DC Current Gain	h _{FE}	$V_{CE} = -2V$, $I_{C} = -500$ mA	100		320	}
Base-Emitter On Voltage	V _{BE} (on)	$V_{CE} = -2V$, $I_{C} = -500$ mA			- 1.0	V
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = -1.5A$, $I_B = -0.03A$			-2.0	V
Output Capacitance	Cob	$V_{CB} = -10V, I_{E} = 0,$ f=1MHz	,	48		pF
Current Gain Bandwidth Product	f _T	$V_{CE} = -2V, I_C = -500 \text{mA}$		120		MHz

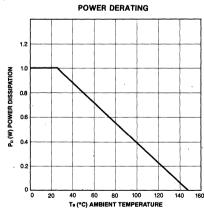
Classification	0	. Y
h _{FE}	100-200	160-320

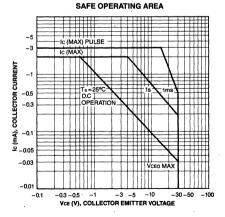










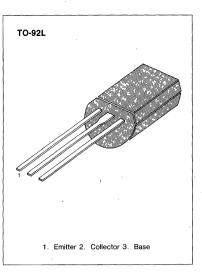


LOW FREQUENCY AMPLIFIER MEDIUM SPEED SWITCHING

- Complement to KSC2331
- Collector-Base Voltage V_{CBO} = −80V
- Collector Dissipation Pc=1W

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	- 80	V
Collector-Emitter Voltage	V _{CEO}	- 60	V
Emitter-Base Voltage	V _{EBO}	-8	V
Collector Current	l _C	- 700	mA
Collector Dissipation	Pc	1	w
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55~+150	. •C

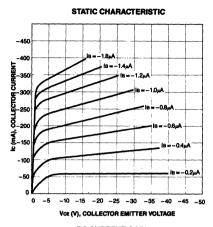


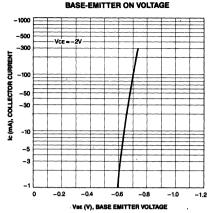
ELECTRICAL CHARACTERISTICS (Ta=25°C)

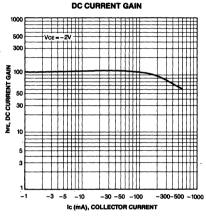
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage Collector-Emitter Breakdown Voltage Emitter-Base Breakdown Voltage Collector Cut-off Current Emitter Cut-off Current DC Current Gain Collector-Emitter Saturation Voltage Base-Emitter Saturation Voltage	BV _{CBO} BV _{CEO} BV _{EBO} I _{CBO} I _{EBO} h _{FE} V _{CE} (sat) V _{BE} (sat)	$\begin{split} I_C = & -100 \mu A, \ I_E = 0 \\ I_C = & -10m A, \ I_B = 0 \\ I_E = & -100 \mu A, \ I_C = 0 \\ V_{CB} = & -60V, \ I_E = 0 \\ V_{EB} = & -5V, \ I_C = 0 \\ V_{CE} = & -2V, \ I_C = & -50m A^* \\ I_C = & -500m A, I_B = & -50m A \\ I_C = & -500m A, I_B = & -50m A \\ I_C = & -500m A, I_B = & -50m A \\ I_C = & -500m A, I_B = & -50m A \\ I_C = & -500m A, I_B = & -50m A \\ I_C = & -500m A, I_B = & -50m A \\ I_C = & -500m A, I_B = & -50m A \\ I_C = & -500m A, I_B = & -50m A \\ I_C = & -500m A, I_B = & -50m A \\ I_C = & -500m A, I_B = & -50m A \\ I_C = & -500m A, I_B = & -50m A \\ I_C = & -500m A, I_B = & -50m A \\ I_C = & -500m A, I_B = & -50m A \\ I_C = & -500m A, I_B = & -50m A \\ I_C = & -500m A, I_B = & -50m A \\ I_C = & -500m A, I_B = & -50m A \\ I_C = & -500m A, I_B = & -50m A \\ I_C = & -500m A, I_C = & -50m A \\ I_C = & -500m A, I_C = & -50m A \\ I_C = & -500m A, I_C = & -50m A \\ I_C = & -500m A, I_C = & -50m A \\ I_C = & -500m A, I_C = & -50m A \\ I_C = & -500m A, I_C = & -50m A \\ I_C = & -500m A, I_C = & -50m A \\ I_C = & -500m A, I_C = & -50m A \\ I_C = & -500m A, I_C = & -50m A \\ I_C = & -500m A, I_C = & -50m A \\ I_C = & -500m A, I_C = & -50m A \\ I_C = & -500m A, I_C = & -50m A \\ I_C = & -5$	- 80 - 60 - 8	-0.3 -0.9	-0.1 -0.1 240 -0.7 -1.2	V V V μΑ μΑ V
Current Gain-Bandwidth Product Output Capacitance	f _τ Cob	$V_{CE} = -10V, I_{C} = -50mA$ $V_{CB} = -10V, I_{E} = 0$ f = 1MHz		100 13	10,000	pF

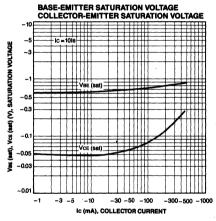
^{*} Pulse Test PW≤350μs, duty cycle≤2%

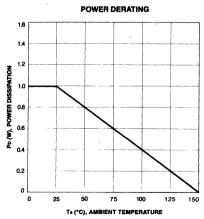
Classification	R ·	0	Y
h _{FE}	40-80	70-140	120-240

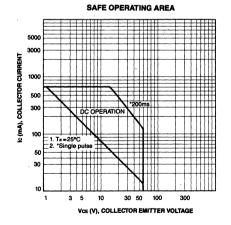










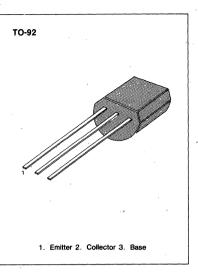


GENERAL PURPOSE APPLICATIONS HIGH TOTAL POWER DISIPATION (PT=600 mW)

High h_{FE} and LOW V_{CE}(sat)

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-30	V
Collector-Emitter Voltage	V _{CEO}	-25	V
Emitter-Base Voltage	V _{EBO}	-5	V
Collector Current	l _C	-700	mA
Base Current	l _B	-150	mA
Collector Dissipation	Pc	600	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55~150	°C



ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
*Base Emitter Voltage	V _{BE}	$V_{CE} = -6V$, $I_{C} = -10mA$	-600	640	-700	mV
Collector Cutoff Current	I _{CBO}	$V_{CB} = -30V, I_{E} = 0$			-100	nA
Emitter Cutoff Current	I _{EBO}	V _{EB} =-5V, I _C =0			-100	nA
*DC Current Gain	h _{FE} 1	$V_{CE} = -1V$, $I_{C} = -100mA$	90	200	400	
	h _{FE} 2	$V_{CE} = -1V$, $I_{C} = -700mA$	50	100		
*Collector Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -700 \text{mA}, I_{B} = -70 \text{mA}$		-0.25	-0.6	V
*Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_{C} = -700 \text{mA}, I_{B} = -70 \text{mA}$		-0.95	-1.2	V
Output Capacitance	Cob	$V_{CB} = -6V$, $I_E = 0$, $f = 1 MHz$		17	40	pF
Curent Gain Bandwidth Product	f _T	$V_{CE}=-6V$, $I_{E}=10mA$	50	160		MHz

^{*} Pulse test: PW ≤ 350µs, duty cycle ≤ 2% Pulsed

Classific	ation F	R 0	Y
h _{FE} 1	90-	180 135-2	70 200-400

AUDIO FREQUENCY AMPLIFIER

• Complement to KSC2002/KSC2003

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage : KSA953	V _{CBO}	-60	V
: KSA954		-80	V
Collector-Emitter Voltage : KSA953	V _{CEO}	-60	V
: KSA954		-80	V
Emitter-Base Voltage	V _{EBO}	-5	V
Collector Current (DC)	lc	-300	mΑ
*Collector Current (Pulse)	l _C	-500	mΑ
Collector Dissipation	Pc	600	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55~150	°C

^{1.} Emitter 2. Collector 3. Base

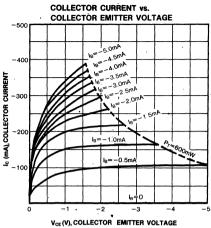
ELECTRICAL CHARACTERISTICS (Ta=25°C)

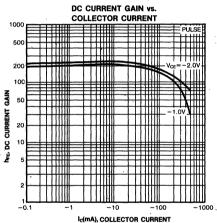
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector Cutoff Current : KSA953	Ісво	V _{CB} =-60V, I _E =0			-100	nA
* : KSA954	-	V _{CB} =-80V, I _E =0			-100	nA
Emitter Cutoff Current	I _{EBO}	$V_{EB} = -5V, I_{C} = 0$			-100	nA
* DC Current Gain	h _{FE1}	$V_{CE} = -1V, I_{C} = -50 \text{mA}$	90	200	400	'
	h _{FE2}	$V_{CE} = -2V$, $I_{C} = -300$ mA	30	80		
*Base-Emitter On Voltage	V _{BE} (on)	$V_{CE} = -6V$, $I_{C} = -10mA$	-600	-660	-700	mV
*Base Emitter Saturation Voltage	V _{BE} (sat)	$I_{c} = -300 \text{mA}, I_{B} = -30 \text{mA}$		-0.85	-1.2	V
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{c} = -300 \text{mA}, I_{B} = -30 \text{mA}$		-0.15	-0.6	V
Output Capacitance	Cob	$V_{CB} = -6V$, $I_E = 0$, $f = 1 MHz$		13	25	pF
Current Gain-Bandwidth Product	f⊤	$V_{CE}=-6V$, $I_{E}=10mA$	50	100		MHz
		(1	

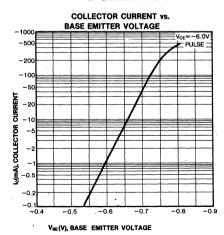
^{*} Pulse Test: PW≤350µs, Duty Cycle≤2% Pulsed

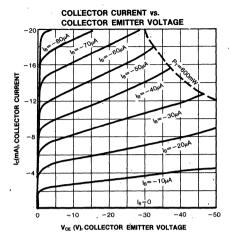
Classification	essification O Y		G
h _{FE} 1	90-180	135-270	200-400

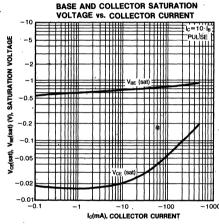
^{*} PW≤10ms, Duty Cycle ≤50%

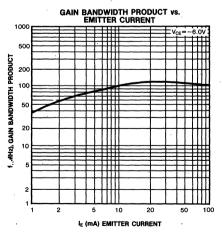


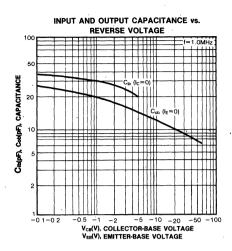


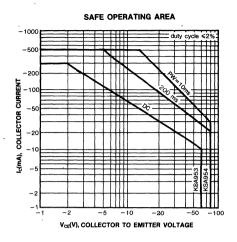


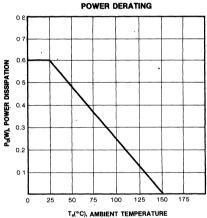










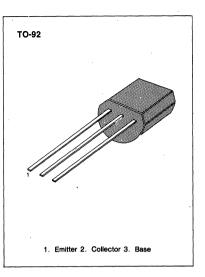


AUDIO FREQUENCY LOW NOISE AMPLIFIER

• Complement to KSC1845

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

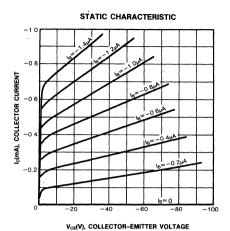
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-120	V
Collector-Emitter Voltage	V _{CEO}	-120	V
Emitter-Base Voltage	V _{EBO}	· -5	V
Collector Current	l _C	-50	mA
Base Current	l _B	-10	mA
Collector Dissipation	P _C	. 500	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55~150	°C

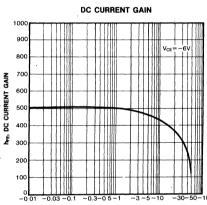


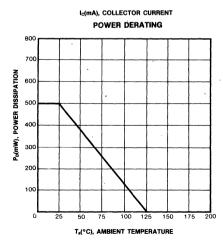
ELECTRICAL CHARACTERISTICS (Ta=25°C)

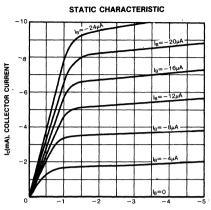
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector Cutoff Current	I _{CBO}	V _{CB} =-120V, I _E =0		İ	-50	nA
Collector Cutoff Current	ICEO	V _{CE} =-100V, R _{BE} =∞			-1	μΑ
Emitter Cutoff Current	I _{EBO}	$V_{EB} = -5V, I_{C} = 0$			-50	nA
DC Current Gain	h _{FE1}	$V_{CE} = -6V, I_{C} = -0.1 \text{mA}$	150	500		
	h _{FE2}	$V_{CE} = -6V$, $I_C = -1mA$	200	500	800	
Base Emitter On Voltage	V _{BE} (on)	$V_{CE} = -6V$, $I_{C} = -1$ mA	-0.55	-0.61	-0.65	V
Collector Emitter Saturation Voltage	V _{CE} (sat)	$I_{\rm C} = -1.0 \text{mA}, I_{\rm B} = -1 \text{mA}$		-0.09	-0.3	V
Current Gain Bandwidth Product	f _T	$V_{CE} = -6V$, $I_E = 1 \text{ mA}$	50	100		MHz
Output Capacitance	Cob	$V_{CB} = -30V, I_{E} = 0$		2	3	pF
·		f=1MHz				
Noise Voltage	NV			25	40	mV

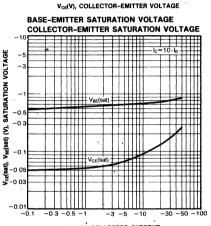
Classification	ssification P		E
h _{FE} (2)	200-400	300-600	400-800

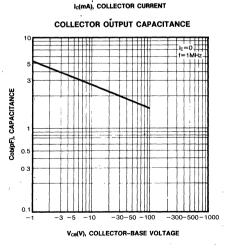


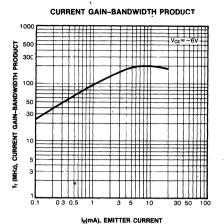








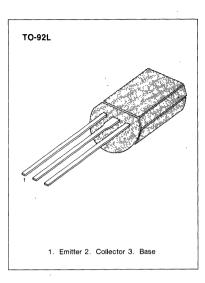




COLOR TV AUDIO OUTPUT COLOR TV VERTICAL DEFLECTION OUTPUT

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-160	V
Collector-Emitter Voltage	V _{CEO}	-160	V
Emitter-Base Voltage	V _{EBO}	-6	V .
Collector Current	Ic	-1	Α
Base Current	l _B	-0.5	Α
Collector Dissipation	Pc	900	mW
Junction Temperature	Tj	150 .	°C
Storage Temperature	Tstg	-55~150	°C

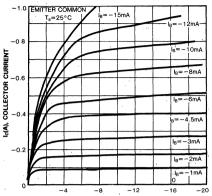


ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector Cutoff Current	I _{CBO}	V _{CB} =-150V, I _E =0			-1	μΑ
Emitter Cutoff Current	I _{EBO}	$V_{EB} = -6V, I_{C} = 0$			-1	μA
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -10 \text{mA}, I_{B} = 0$	-160			V
DC Current Gain	h _{FE}	$V_{CE} = -5V, I_{C} = -200 \text{mA}$	60		320	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{\rm C} = -500 \text{mA}, I_{\rm B} = -50 \text{mA}$			-1.5	V
Base Emitter On Voltage	V _{BE} (on)	$V_{CE} = -5V, I_{C} = -5mA$	-0.45		-0.75	V
Current Gain-Bandwidth Product	f⊤	$V_{CE} = -5V, I_{C} = -200 \text{mA}$	15	50		MHz
Output Capacitance	Cob	$V_{CB} = -10V, I_{E} = 0$			35	рF
•		f=1MHz				

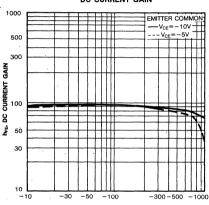
Classification	R	0	Y
h _{FE}	60-120	100-200	160-320





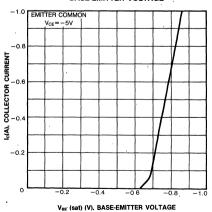
VCE(V), COLLECTOR-EMITTER VOLTAGE

DC CURRENT GAIN

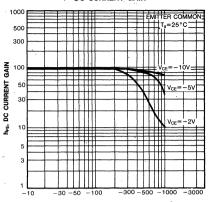


Ic(mA), COLLECTOR CURRENT

BASE-EMITTER VOLTAGE

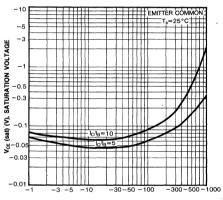


DC CURRENT GAIN



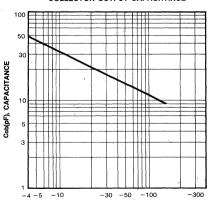
Ic(mA), COLLECTOR CURRENT

COLLECTOR-EMITTER SATURATION VOLTAGE

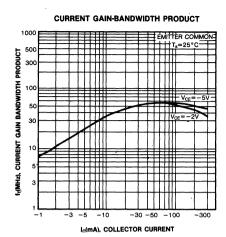


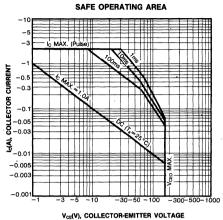
I_C(mA), COLLECTOR CURRENT

COLLECTOR OUTPUT CAPACITANCE



V_{CB}(V), COLLECTOR-BASE VOLTAGE





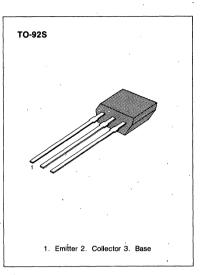
LOW FREQUENCY POWER AMPLIFIER

- Complement to KSC2710
- Collector Dissipation Pc = 300mW

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current (DC) * Collector Current (pulse) Collector Dissipaiton Junction Temperature Storage Temperature	V _{CBO} V _{CEO} V _{EBO} I _C (DC) I _C (pulse) P _C Tj Tstg	-40 -20 -5 -500 -700 300 150 -55~150	V V V mA mA mW °C °C

^{*} PW≤10mS, duty Cycle≤50%.

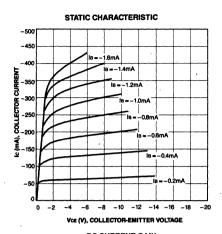


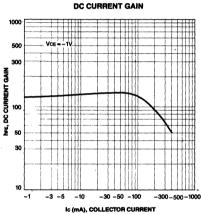
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

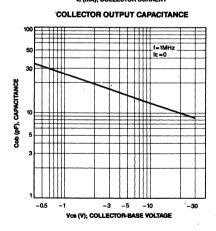
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_C = -100 \mu A, I_E = 0$	- 40			٧
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -10 \text{mA}, I_{B} = 0$	- 20			٧
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = -100 \mu A$, $I_C = 0$	-5			V
Collector Cut-off Current	I _{CBO}	$V_{CB} = -25V, I_{E} = 0$	i		-100	nA
Emitter Cut-off Current	I _{EBO}	$V_{EB} = -3V, I_{C} = 0$			-100	nΑ
DC Current Gain	h _{FE}	$V_{CE} = -1V$, $I_{C} = -100$ mA	40		400	
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = -500 \text{mA}, I_B = -50 \text{mA}$		-0.3	-0.4	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_{\rm C} = -500 {\rm mA}, I_{\rm B} = -50 {\rm mA}^$		- 1.0	- 1.3	V

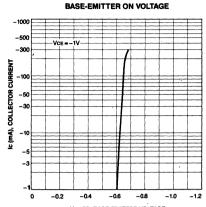
^{*} Pulse Test: PW $\leq 350\mu s$, duty cycle $\leq 2\%$

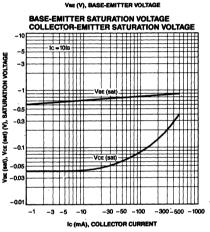
Classification	R	.0	Υ .	G
h _{FE}	40-80	70-140	120-240	200-400









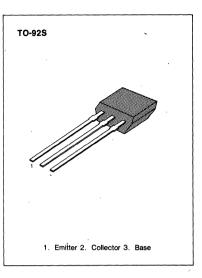


AUDIO FREQUENCY LOW NOISE AMPLIFIER

Complement to KSC2784

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

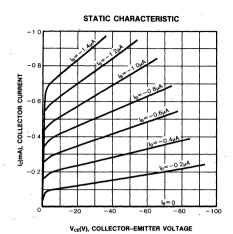
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-120	V
Collector-Emitter Voltage	V _{CEO}	-120	V
Emitter-Base Voltage	V _{EBO}	-5	V
Collector Current	l _c	-50	mA
Base Current	l _B	-10	mA
Collector Dissipation	Pc	300	mW .
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55 ~ 150	°C

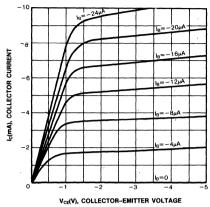


ELECTRICAL CHARACTERISTICS (Ta=25°C)

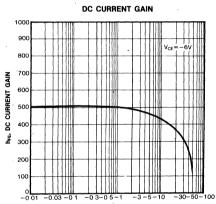
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector Cutoff Current	I _{CBO}	V _{CB} =-120V, I _E =0			-50	nA
Collector Cutoff Current	I _{CEO}	V _{CE} =-100V, R _{BE} =∞			-1	μΑ
Emitter Cutoff Current	I _{EBO}	$V_{EB} = -5V, I_{C} = 0$,	-50	nΑ
DC Current Gain	h _{FE1}	$V_{CE} = -6V, I_{C} = -0.1 \text{mA}$	150	500		
	h _{FE2}	$V_{CE}=-6V$, $I_{C}=-1$ mA	200	500	800	
Base Emitter On Voltage	V _{BE} (on)	$V_{CE}=-6V$, $I_{C}=-1$ mA	-0.55	-0.61	-0.65	V
Collector Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -10 \text{mA}, I_{B} = -1 \text{mA}$		-0.09	-0.3	V.
Current Gain Bandwidth Product	f _T	$V_{CE} = -6V$, $I_E = 1 \text{ mA}$	- 50	100		MHz
Output Capacitance	Cob	$V_{CB} = -30V, I_E = 0$		2	3	pF
		f=1MHz				
Noise Voltage	NV			25	40	. mV

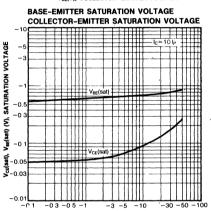
Classification	P	F	E
h _{FE} (2)	200-400	300-600	400-800

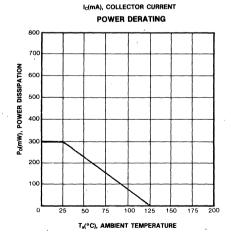


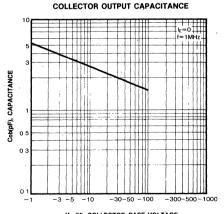


STATIC CHARACTERISTIC





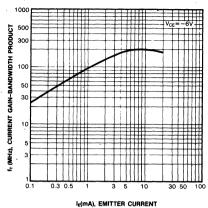




Ic(mA), COLLECTOR CURRENT

VCB(V), COLLECTOR-BASE VOLTAGE

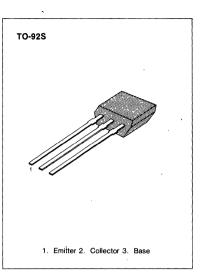




- Complement to KSC2785
- Collector-Base Voltage V_{CBO} = −60V

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

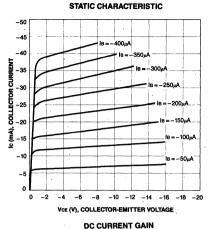
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-60	٧ .
Collector-Emitter Voltage	V _{CEO}	-50	V
Emitter-Base Voltage	V _{EBO}	-5	٧
Collector Current	lc	· - 150	mA
Collector Dissipation	Pc	250	mW
Junction Temperature	Ti	150	°C
Storage Temperature	Tstg	−55 ~ 150	°C

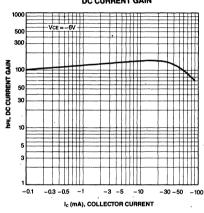


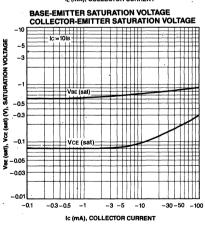
ELECTRICAL CHARACTERISTICS (Ta=25°C)

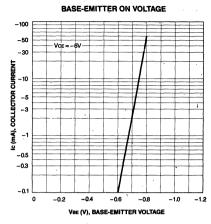
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage Collector-Emitter Breakdown Voltage	BV _{CBO} BV _{CEO}	$I_C = -100 \mu A, I_E = 0$ $I_C = -10 mA, I_B = 0$	-60 -50			V V
Emitter-Base Breakdown Voltage Collector Cut-off Current Emitter Cut-off Current	BV _{EBO} I _{CBO}	$I_E = -10\mu A$, $I_C = 0$ $V_{CB} = -60V$, $I_E = 0$ $V_{EB} = -5V$, $I_C = 0$	-5		- 0.1 - 0.1	V μ A μ A
DC Current Gain Collector-Emitter Saturation Voltage	h _{FE} V _{CE} (sat)	$V_{CE} = -6V, I_C = -1mA$ $I_C = -100mA, I_B = -10mA$	40	-0.18	700 -0.3	v
Base-Emitter On Voltage Current-Gain-Bandwidth Product Output Capacitance	V _{BE} (on) f _T Cob	$V_{CE} = -6V, I_{C} = -1mA$ $V_{CE} = -6V, I_{C} = -10mA$ $V_{CB} = -10V, I_{E} = 0$ $f = 1MHz$	0.50 50	- 0.62 180 2.8	- 0.80	V MHz pF
Noise Figure	NF	$V_{CE} = -6V, I_{C} = -0.3\text{mA}$ $f = 100\text{Hz}, Rs = 10\text{K}\Omega$		6.0	20	dB

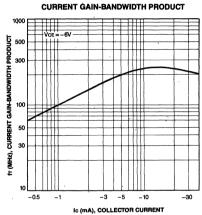
Classification	R	o	Y	G	L
h _{FE}	40-80	70-140	120-240	200-400	350-700

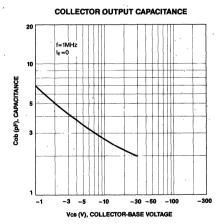










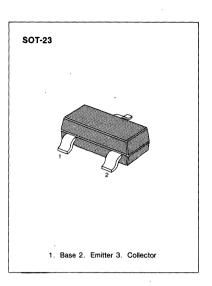


LOW FREQUENCY POWER AMPLIFIER

• Complement to KSA2859

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-35	٧
Collector-Emitter Voltage	V _{CEO}	-30	V
Emitter-Base Voltage	V _{EBO}	-5	V
Collector Current	l _c	-500	mΑ
Collector Dissipation	Pc	150	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55~150	°C



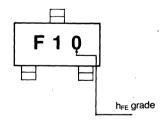
ELECTRICAL CHARACTERISTICS (Ta=25°C)

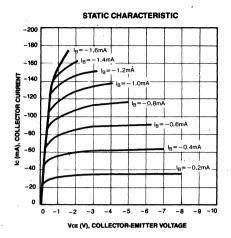
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector Cutoff Current	I _{CBO}	$V_{CB} = -35V, I_{E} = 0$			-0.1	μΑ
Emitter Cutoff Current	I _{EBO}	$V_{EB}=-5V$, $I_{C}=0$			-0.1	μΑ
DC Current Gain	h _{FF} 1	$V_{CE} = -1V, I_{C} = -100 \text{mA}$	70		240	
	h _{FE} 2	$V_{CE} = -6V, I_{C} = -400 \text{mA}$	25	}		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -100 \text{mA}, I_{B} = -10 \text{mA}$		-0.1	-0.25	V
Base-Emitter On Voltage	V _{BE} (on)	$I_{C} = -100 \text{mA}, V_{CE} = -1 \text{V}$		-0.8	-1.0	V
Current Gain-Bandwidth Product	f _T	$I_{C} = -20 \text{mA}, V_{CE} = -6 \text{V}$		200		MHz
Output Capacitance	Cob	$V_{CB} = -6V, I_{E} = 0$		13		pF
•		f=1MHz				

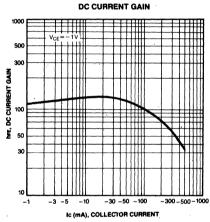
hFE CLASSIFICATION

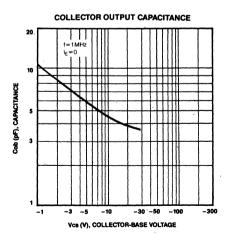
Classification	0 .	Y
h _{FE} (1)	70-140	120-240

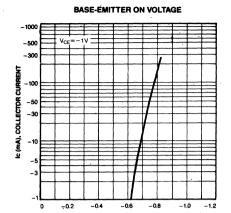
Marking

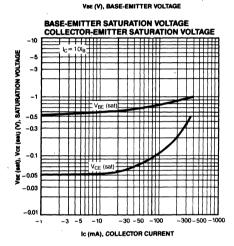










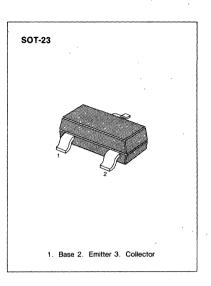


• Complement to KSC3265

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-30	٧
Collector-Emitter Voltage	V _{CEO}	-25	V
Emitter-Base Voltage	V _{EBO}	-5	V
Collector Current	· lc	-800	mA
Base Current	l _B	-160	mA
Collector Dissipation	Pc	200	mW
Junction Temperature	Tj -	150	°C
Storage Temperature	Tstg	-55~150	°C

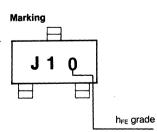
[·] Refer to KSA643 for graphs.



ELECTRICAL CHARACTERISTICS (Ta=25°C)

· Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =-10mA, I _B =0	-25			٧
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = -1 \text{ mA}, I_C = 0$	~5			V
Collector Cutoff Current	I _{CBO}	$V_{CB} = -30V, I_E = 0$			-100	nA
Emitter Cutoff Current	I _{EBO}	$V_{EB} = -5V, I_{C} = 0$			-100	nA
DC Current Gain	h _{FE1}	V _{CE} =-1V, I _C =-100mA	100		320	
	h _{FE2}	$V_{CE} = -1V$, $I_{C} = -800$ mA	40			
Collector Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -500 \text{mA}, I_{B} = -20 \text{mA}$			-0.4	,V
Base-Emitter (o m) Voltage	V _{BE} (on)	$V_{CE} = -1V$, $I_{C} = -10mA$	-0.5		-0.8	V
Current Gain-Bandwidth Product	f _T	$V_{CE} = -5V, I_{C} = -10mA$		120		MHz
Output Capacitance	Cob	$V_{CB} = -10V$, $I_1 = 0$		13		pF
		f=1MHz		_		

Classification	0	Y
h _{FE} (1)	100-200	160-320



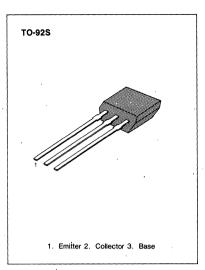
LOW FREQUENCY POWER AMPLIFIER

- Complement to KSC3488
- Collector Dissipation Pc = 300mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current (DC) * Collector Current (pulse) Collector Dissipation Junction Temperature	V _{CBO} V _{CEO} V _{EBO} I _C (DC) I _C (pulse) P _C Ti	- 30 - 25 - 5 - 300 - 500 300	V V V mA mA mW
Storage Temperature	Tstg	-55~150	°C

^{*} PW≤10ms, duty cycle ≤50%

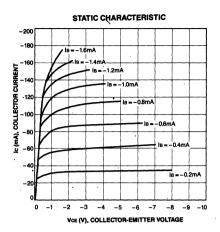


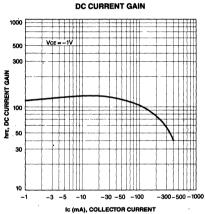
ELECTRICAL CHARACTERISTICS (Ta=25°C)

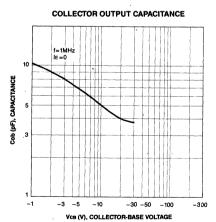
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{\rm C} = -100 \mu A, I_{\rm E} = 0$	- 30			٧
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -10 \text{mA}, I_{B} = 0$	- 25			٧
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_{\rm E} = -10 \mu A$, $I_{\rm C} = 0$	-5			.V
Collector Cut-off Current	I _{CBO}	$V_{CB} = -25V$, $I_{E} = 0$,	- 100	nΑ
Emitter Cut-off Current	I _{EBO}	$V_{EB} = -3V$, $I_{C} = 0$			- 100	nA
*DC Current Gain	h _{FE}	$V_{CE} = -1V$, $I_{C} = -50 \text{mA}$	70		400	nA
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -300 \text{mA}, I_{B} = -30 \text{mA}$. – 0.35	- 0.6	٧

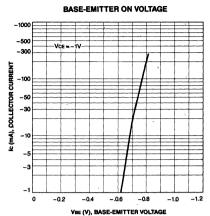
^{*} Pulse Test: PW ≤ 350 μs, duty cycle ≤ 2%

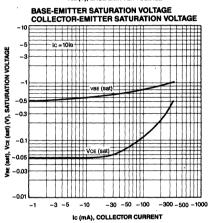
Classification	0	Υ	G
h _{FE}	70-140	120-240	200-400









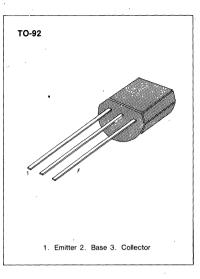


AUDIO FREQUENCY POWER AMPLIFIER

- Complement to KSD471A
- Collector Current I_C = −1A
- Collector Dissipation Pc=800mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

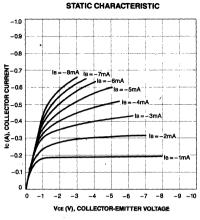
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	- 30	v
Collector-Emitter Voltage	V _{CEO}	- 25	. V
Emitter-Base Voltage	V _{EBO}	-5	V
Collector Current	l _c	- 1.0	Α
Collector Dissipation	Pc	800	mW
Junction Temperature	Ti	150	°C
Storage Temperature	Tstg	−55 ~ 150	°C

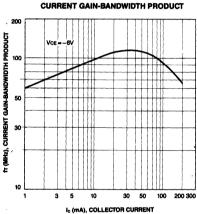


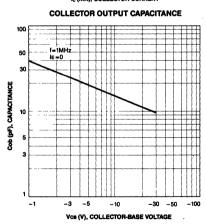
ELECTRICAL CHARACTERISTICS (Ta=25°C)

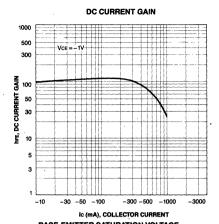
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage Collector-Emitter Breakdown Voltage Emitter-Base Breakdown Voltage Collector Cut-off Current DC Current Gain Collector-Emitter Saturation Voltage Base-Emitter Saturation Voltage Current-Gain-Bandwidth Product Output Capacitance	BV _{CBO} BV _{CEO} BV _{EBO} IcBO hre V _{CE} (sat) V _{BE} (sat) f _T Cob	$\begin{split} & l_{C} = -100\mu\text{A}, \ l_{E} = 0 \\ & l_{C} = -100\mu\text{A}, \ l_{C} = 0 \\ & l_{E} = -100\mu\text{A}, \ l_{C} = 0 \\ & V_{CB} = -30V, \ l_{E} = 0 \\ & V_{CE} = -1V, \ l_{C} = -100\text{mA} \\ & l_{C} = -1A, \ l_{B} = -0.1A \\ & l_{C} = -1A, \ l_{B} = -0.1A \\ & V_{CE} = -6V, \ l_{C} = -10\text{mA} \\ & V_{CB} = -6V, \ f = 1 \ \text{MHz}, \\ & l_{E} = 0 \end{split}$	-30 -25 -5 70	110 18	-0.1 400 -0.5 -1.2	V V μA V V MHz pF

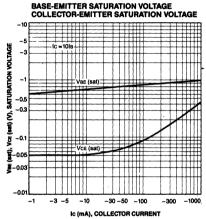
Classification	0	Y	G
, h _{FE}	70-140	120-240	200-400

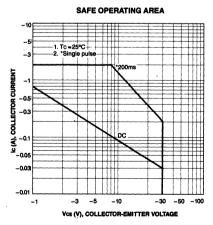












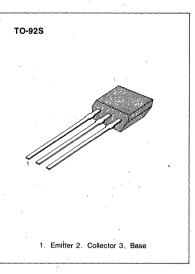
AUDIO FREQUENCY AMPLIFIER

• Complement to KSD1020

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-30	٧
Collector-Emitter Voltage	V _{CEO}	-25	V
Emitter-Base Voltage	V_{EBO}	-5.0	V
Collector Current (DC)	l _C	-700	mA
*Collector Current (Pulse)	l _C	-1.0	Α
Collector Dissipation	Pc	350	mW
Junction Temperature	T,	150	°C
Storage Temperature	Tstg	-55~150	°C

^{*} PW \leq 10 ms, duty cycle \leq 50 %

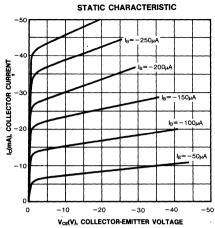


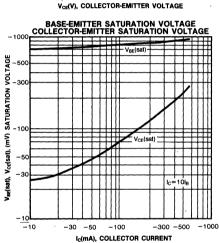
ELECTRICAL CHARACTERISTICS (Ta=25°C)

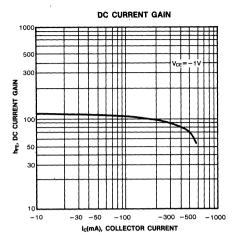
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector Cutoff Current	I _{CBO}	$V_{CB} = -30V, I_{E} = 0$			-100	nA
Emitter Cutoff Current	I _{EBO}	$V_{EB}=-5V$, $I_{C}=0$			-100	nA
*DC Durrent Gain	h _{FE} 1	$V_{CE} = -1V$, $I_{C} = -100$ mA	70	200	400	
,	h _{FE} 2	$V_{CE} = -1V$, $I_{C} = -700 \text{mA}$	35	100		
*Base Emitter Voltage	V _{BE}	$V_{CE} = -6V, I_{C} = -10mA$	-600	-640	-700	mV
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -700 \text{mA}, I_{B} = -70 \text{mA}$		-0.25	-0.4	V
*Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_{\rm C} = -700 \text{mA}, I_{\rm B} = -70 \text{mA}$		-0.95	-1.2	V
Output Capacitance	Сов	$V_{CB} = -6V$, $I_E = 0$, $f = 1MHz$		17	40	pF
Current Gain-Bandwidth Product	f _T	$V_{CE} = -6V$, $I_E = 10mA$	50	160		MHz

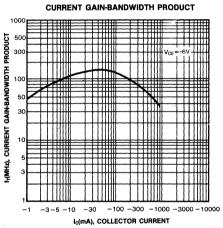
^{*} Pulse Test: PW≤350 μs, Duty Cycle ≤ 2% Pulsed

Classification	0	. Y	G
h _{FE} (1)	70-140	120-240	200-400







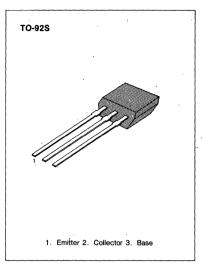


AUDIO FREQUENCY POWER AMPLIFIER

- Complement to KSD1021
- Collector Current I_C = −1A
- Collector Dissipation Pc = 350mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

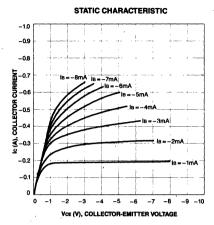
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	- 30	v
Collector-Emitter Voltage	V _{CEO}	- 25	V
Emitter-Base Voltage	V _{EBO}	-5	V
Collector Current	lc	- 1.0	Α
Collector Dissipation	Pc	350	mW
Junction Temperature	Ti	150	- °C
Storage Temperature	Tstg	−55 ~ 150	°C

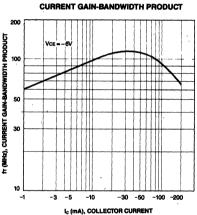


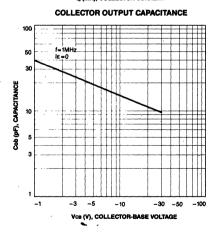
ELECTRICAL CHARACTERISTICS (Ta=25°C)

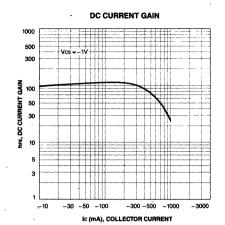
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage Collector-Emitter Breakdown Voltage Emitter-Base Breakdown Voltage Collector Cut-off Current DC Current Gain Collector-Emitter Saturation Voltage Base-Emitter Saturation Voltage Current-Gain-Bandwidth Product Output Capacitance	BV _{CBO} BV _{CEO} BV _{EBO} I _{CBO} h _{FE} V _{CE} (sat) V _{BE} (sat) f _T Cob	$\begin{split} &I_C = -100\mu\text{A},\ I_E = 0\\ &I_C = -100\mu\text{A},\ I_B = 0\\ &I_E = -100\mu\text{A},\ I_C = 0\\ &V_{CB} = -30V,\ I_E = 0\\ &V_{CE} = -1V,\ I_C = -100\text{mA}\\ &I_C = -1A,\ I_B = -0.1A\\ &I_C = -1A,\ I_B = -0.1A\\ &V_{CB} = -6V,\ I_C = -10\text{mA}\\ &V_{CB} = -6V,\ I_C = -10\text{mA}\\ &I_E = 0\\ \end{split}$	- 30 - 25 - 5 - 70	110 18	-0.1 400 -0.5 -1.2	V V V µA V V MHz pF

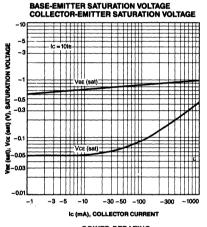
Classification	0	Y	G	
h _{FE}	70-140	120-240	200-400	

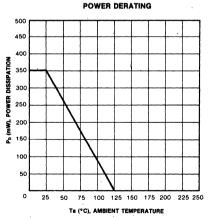










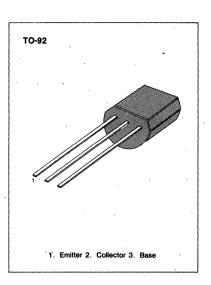


AUDIO FREQUENCY POWER AMPLIFIER MEDIUM SPEED SWITCHING

Complement to KSD1616/1616A

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage : KSB1116	V _{CBO}	-60	٧
: KSB1116A		-80	V
Collector-Emitter Voltage : KSB1116	V _{CEO}	-50	٧
: KSB1116A		-60	٧
Emitter-Base Voltage	V _{EBO}	-6	٧
Collector Current (DC)	l _c	-1	Α
*Collector Current (Pulse)	l _C	-2	Α
Collector Dissipation	Pc .	0.75	W
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55~150	°C



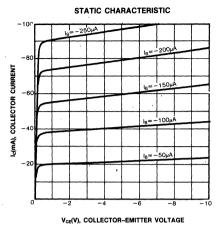
ELECTRICAL CHARACTERISTICS (Ta=25°C)

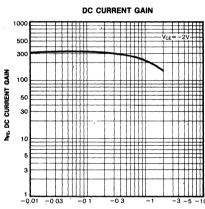
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector Cutoff Current	Ісво	$V_{CB} = -60V, I_{E} = 0$			-100	nA
Emitter Cutoff Current	I _{EBO}	$V_{EB} = -6V, I_{C} = 0$			-100	nA
*DC Current Gain : KSB1116	h _{FE1}	$V_{CE} = -2V$, $I_{C} = -100 \text{mA}$	135		600	
: KSB1116A			135		400	
	h _{FE2}	$V_{CE} = -2V, I_{C} = -1A$	81			
*Base Emitter On Voltage	·V _{BE} (on)	$V_{CE} = -2V$, $I_{C} = -50mA$	-600	-650	-700	mV
*Collector Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -1A$, $I_{B} = -50mA$		-0.2	-0.3	V
*Base Emitter Saturation Voltage	V _{BE} (sat)	$I_{C} = -1A$, $I_{B} = -50mA$. :	-0.9	-1.2	٧
Output Capacitance	Cop	$V_{CB} = -10V, I_{E} = 0$ f = 1MHz	,	25		pF
Current Gain Bandwidth Product	f _T	$V_{CE} = -2V, I_{C} = -100 \text{mA}$	70	120		MHz
Turn On Time	ton	V _{cc} =-10V, I _c =-100mA		0.07		μS
Storage Time	ts	$I_B 1 = -I_B 2 = -10 \text{mA}$		0.7		μS
Fall Time	tf	V_{BE} (off) = 2 \sim 3V		0.07		μs

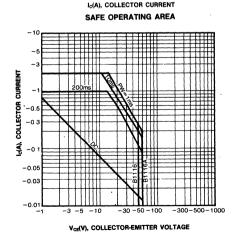
^{*} Pulse Test: PW≤350µs, Duty Cycle≤2% Pulsed

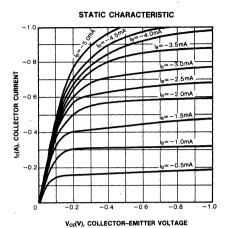
Classification	Υ	G	L ·	
h _{FE} (1)	135-270	200-400	300-600	

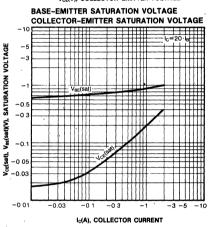
^{*} PW≤10ms, Duty Cycle≤50%

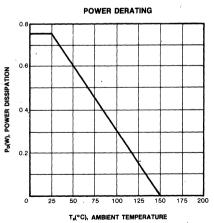


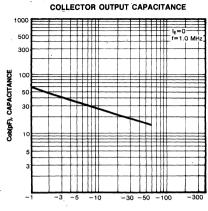




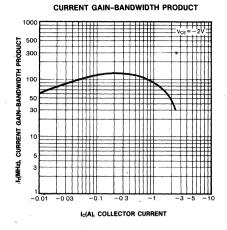


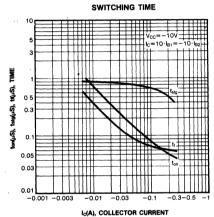






 $V_{CB}(V)$, COLLECTOR-BASE VOLTAGE



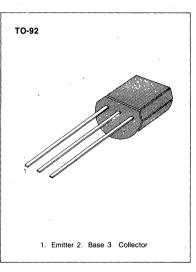


AM FREQUENCY CONVERTER IF AMPLIFIER

- Current Gain Bandwidth Product f₇=100MHz (Typ)
- Complement to KSA542

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

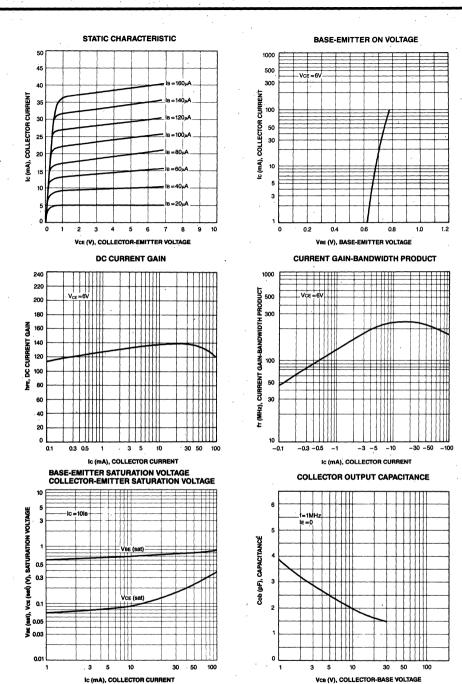
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	30	V
Collector-Emitter Voltage	V _{CEO}	25	V
Emitter-Base Voltage	V _{EBO}	5	V
Collector Current	lc	50	mA
Collector Dissipation	Pc	250	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55~150	°C



ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 100 \mu A, I_{E} = 0$	30			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C = 10 \text{mA}, I_B = 0$	25	-		V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_{E} = -10 \mu A$, $I_{C} = 0$	5	1	1	V
Collector Cut-off Current	Ісво	$V_{CB} = 25V, I_E = 0$	ł		0.1	μA
Emitter Cut-off Current	I _{EBO}	V _{EB} = 5V, I _C = 0			0.1	μA
DC Current Gain	h _{FE}	$V_{CE} = 6V$, $I_C = 1mA$	40	}	1000	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = 10 \text{mA}, I_B = 1 \text{mA}$		0.1	0.2	V
Current Gain-Bandwidth Product	f _T	V _{CE} =6V, I _C =1mA	į.	100		MHz
Output Capacitance	Cob	$V_{CB}=6V$, $I_E=0$ f=1MHz		2.6	4.4	pF

Classification	R	0	Y	G	L
h _{FE}	40-80	70-140	120-240	200-400	350-700

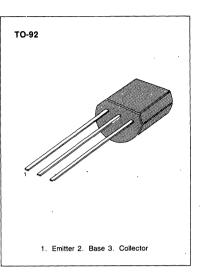


TV FINAL PICTURE IF AMPLIFIER APPLICATIONS

• G_{Pe}=33dB (Typ) (f=45MHz)

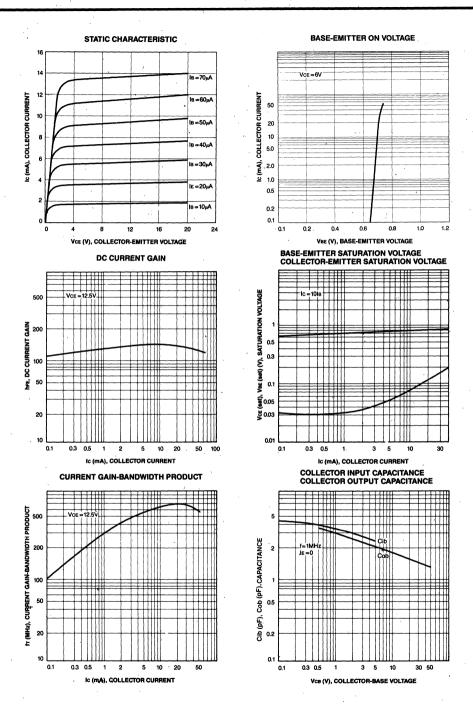
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	30	v
Collector-Emitter Voltage	V _{CEO}	25	V
Emitter-Base Voltage	V _{EBO}	4	V
Collector Current	l _c	50	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj	150	•C
Storage Temperature	Tstg	-55~150	°C



ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 10 \mu A, I_{E} = 0$	30			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =5mA, I _B =0	25			V
Collector Cut-off Current	Ісво	$V_{CB} = 30V, I_E = 0$			0.1	μΑ
Emitter Cut-off Current	I _{EBO}	$V_{EB} = 3V, I_{C} = 0$			0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =12.5V, I _C =12.5mA	20		200	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =15mA, I _B =1.5mA			0.2	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =15mA, I _B =1.5mA			1.5 ′	V
Output Capacitance	Cob	V _{CB} =10V, I _E =0, f=1MHz	0.8		2	pF
Collector-Base Time Constant	Cc'rbb'	$V_{CB} = 10V, I_{E} = -1mA$ f=30MHz			25	ps
Current Gain-Bandwidth Product	f⊤	V _{CE} = 12.5V, I _C = 12.5mA	300			MHz
Power Gain	Gpe	$V_{CC} = 12.5V$, $f = 45MHz$ $I_E = -12.5mA$	28		36	dB

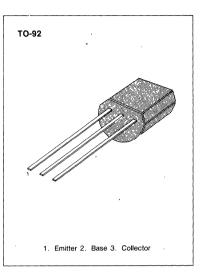


LOW FREQUENCY AMPLIFIER HIGH FREQUENCY OSCILLATOR

- Complement to KSA539
- Collector-Base Voltage V_{CBO} = 60V

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

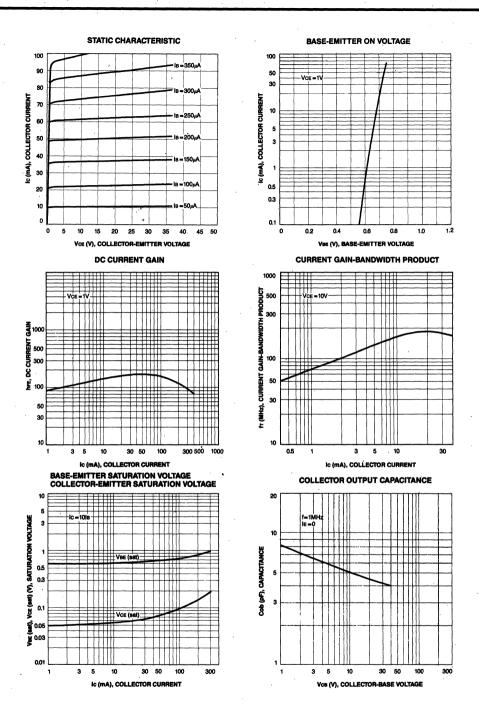
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	60	V
Collector-Emitter Voltage	V _{CEO}	45	V
Emitter-Base Voltage	V _{EBO}	5	V
Collector Current	Ic	200	mA
Collector Dissipation	Pc	400	mW
Junction Temperature	Ti	150	°C
Storage Temperature	Tstg	-55 ~ 150	°C



ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{\rm C} = 100 \mu A, I_{\rm E} = 0$	60			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 10 \text{mA}, I_{B} = 0$	45			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_{\rm F} = -10 \mu A$, $I_{\rm C} = 0$	5			V
Collector Cut-off Current	Ісво	$V_{CB} = 45V, I_{E} = 0$			0.1	μA
Emitter Cut-off Current	I _{EBO}	$V_{EB} = 3V, I_{C} = 0$			0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = 1V, I_{C} = 50 \text{mA}$	40		400	1
Base-Emitter On Voltage	V _{BE} (on)	$V_{CE} = 10V, I_{C} = 10mA$	0.6	0.65	0.9	V
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 150 \text{mA}, I_{B} = 15 \text{mA}$	1.	0.15	0.4	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_{C} = 150 \text{mA}, I_{B} = 15 \text{mA}$		0.83	1.1	V
Current Gain-Bandwidth Product	fr	$V_{CE} = 10V, I_{C} = 10mA$	100	200		MHz
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1MHz		4		pF

Classification	R	0	Υ	G
h _{FE}	40-80	70-140	120-240	200-400

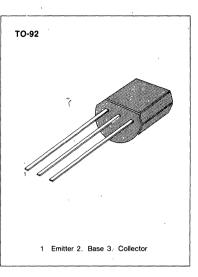


FM RADIO RF AMP, MIX, CONV, OSC, IF AMP

• High Current Gain Bandwidth Product f_T = 250MHz (Typ)

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

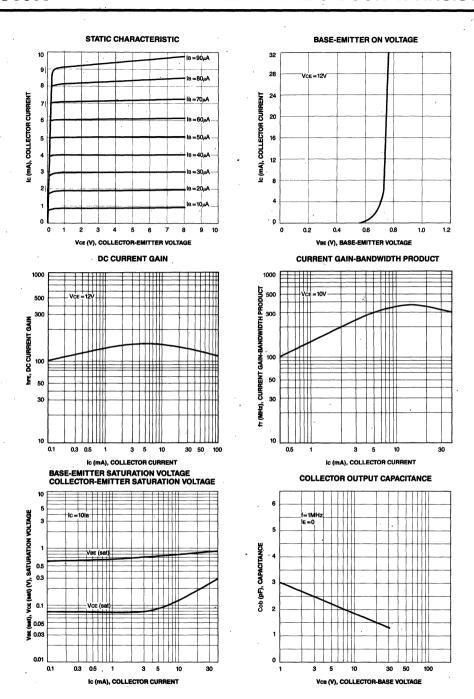
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	35	٧
Collector-Emitter Voltage	V _{CEO}	30	V
Emitter-Base Voltage	V _{EBO}	4	V
Collector Current	. Ic	30	mA
Collector Dissipation .	Pc	250	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55 ~ 150	°C



ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 100 \mu A, I_{E} = 0$	35			٧
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C = 5mA$, $I_B = 0$	30			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = -10 \mu A$, $I_C = 0$	4			V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 30V, I_{E} = 0$			0.1	μΑ
Emitter Cut-off Current	I _{EBO}	$V_{EB} = 4V, I_{C} = 0$			0.1	μA
DC Current Gain	h _{FE}	$V_{CE} = 12V, I_{C} = 2mA$	40		240	'
Base-Emitter On Voltage	V _{BE} (on)	$V_{CE} = 6V$, $I_{C} = 1mA$	0.65	0.70	0.75	V
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = 10 \text{mA}$, $I_B = 1 \text{mA}$		0.1	0.4	V
Current Gain-Bandwidth Product	f _T	V _{CE} = 10V, I _C = 1mA	100	250		MHz
Output Capacitance	Cob	V _{CB} = 10V, I _E = 0 f=1MHz		2.0	3.2	pF

Classification	R	0	Y
h _{FE}	40-80	70-140	120-240



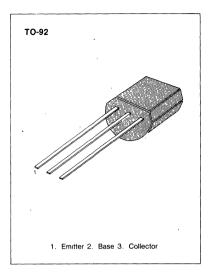
(

FM/AM RADIO RF AMP, CONV, OSC, IF AMP

• Current-Gain-Bandwidth Product f_T=200MHz

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

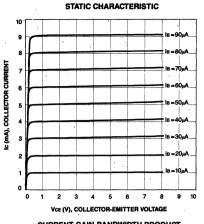
Symbol	Rating	Unit
V _{CBO}	35	V
V _{CEO}	4	V
Ic Pc	100 - 250	mA mW
Tj Tsta	150 ~55 ~ 150	°C
	VCBO VCEO VEBO IC PC	V _{CBO} 35 V _{CEO} 30 V _{EBO} 4 I _C 100 P _C 250 Tj 150

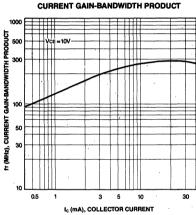


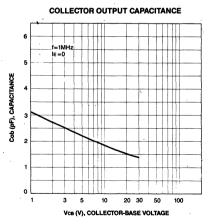
ELECTRICAL CHARACTERISTICS (Ta=25°C)

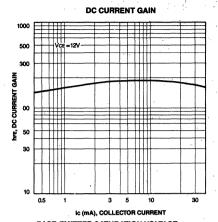
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{\rm C} = 100 \mu A, I_{\rm E} = 0$	35			ν
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{\rm C} = 5 \text{mA}, I_{\rm B} = 0$	30			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_{\rm E} = 10 \mu A, I_{\rm C} = 0$	4			V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 30V, I_{E} = 0$			0.1	μΑ
Emitter Cut-off Current	I _{EBO}	$V_{EB} = 4V, I_{C} = 0$			0.1	μΑ
DC Current Gain	h _{EE}	$V_{CE} = 12V, I_{C} = 2mA$	40		400	1
Base-Emitter On Voltage	V _{BE} (on)	$V_{CE} = 6V$, $I_C = 1mA$	0.65	0.70	0.75	V
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = 10 \text{mA}, I_B = 1 \text{mA}$	Ì	0.1	0.4	· v
Current Gain-Bandwidth Product	f _T	$V_{CE} = 10V, I_{C} = 1mA$	80	200		MHz
Output Capacitance	Cob	$V_{CB} = 10V$, $I_E = 0$ f = 1MHz		2.0	3.5	pF

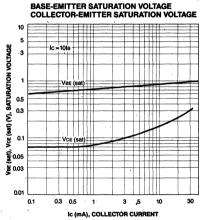
Classification	R	0	Υ.	G
h _{FE}	40-80	70-140	120-240	200-400









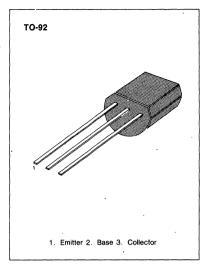


LOW FREQUENCY AMPLIFIER

- Complement to KSA545
- High Collector-Base Voltage V_{CBO} = 70V
- Collector Dissipation Pc = 400mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

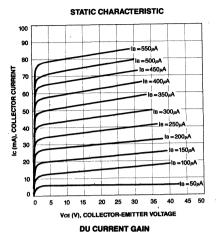
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	70	٧
Collector-Emitter Voltage	V _{CEO}	60	V
Emitter-Base Voltage	V _{EBO}	• 5	V
Collector Current	l _c	200	mA
Collector Dissipation	Pc	400	mW
Junction Temperature	Tj	150	•c
Storage Temperature	Tstg	-55~150	•c

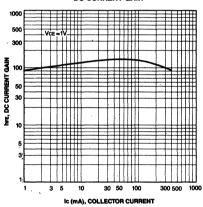


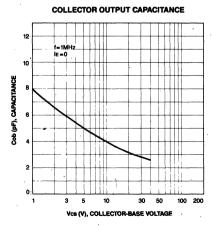
ELECTRICAL CHARACTERISTICS (Ta=25°C)

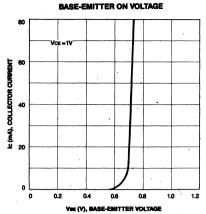
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{\rm C} = 100 \mu A, I_{\rm E} = 0$	70			v
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 10 \text{mA}, I_{B} = 0$	60			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = -10 \mu A$, $I_C = 0$	5		}	V
Collector Cut-off Current	Ісво	$V_{CB} = 45V, I_{E} = 0$			0.1	μΑ
Emitter Cut-off Current	I _{EBO}	V _{EB} = 3V, I _C = 0	,		. 0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = 1V, I_{C} = 50mA$	40		400	
Base-Emitter On Voltage	V _{BE} (on)	$V_{CE} = 10V, I_{C} = 10mA$	0.60		0.90	V
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 150 \text{mA}, I_{B} = 15 \text{mA}$		0.15	0.4	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_C = 150 \text{mA}, I_B = 15 \text{mA}$		0.83	1.1	V

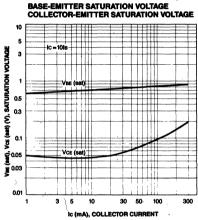
Classification	R	0	Y	G
h _{FE}	40-80	70-140	120-240	200-400









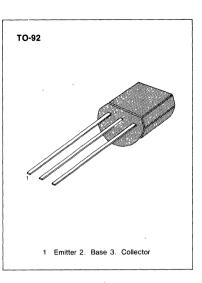


LOW FREQUENCY, LOW NOISE AMPLIFIER

- Collector-Base Voltage V_{CBO} = 30V
- Low Noise Level NL=50mV (Max)

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

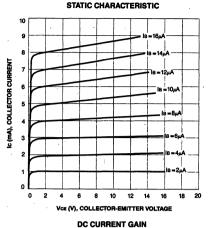
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	30	V
Collector-Emitter Voltage	V _{CEO}	25	V
Emitter-Base Voltage	V _{EBO}	5	V
Collector Current	l _c	50	mA
Collector Dissipation	Pċ	250	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55 ~ 150	•C

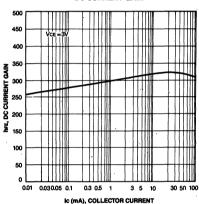


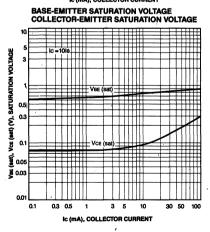
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

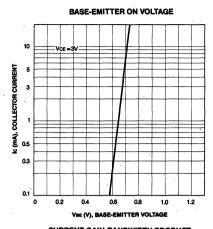
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage Collector-Emitter Breakdown Voltage Emitter-Base Breakdown Voltage Collector Cut-off Current Emitter Cut-off Current DC Current Gain Collector-Emitter Saturation Voltage Base-Emitter On Voltage Current Gain-Bandwidth Product Noise Level	BVCBO BVCEO BVEBO ICBO IEBO hFE VCE (sat) VBE (ON) f _T NL	$\begin{split} &I_{C}=100\mu\text{A},\ I_{E}=0\\ &I_{C}=10\text{mA},\ I_{B}=0\\ &I_{E}=10\mu\text{A},\ I_{C}=0\\ &V_{CB}=25\text{V},\ I_{E}=0\\ &V_{CB}=3\text{V},\ I_{C}=0\\ &V_{CE}=3\text{V},\ I_{C}=0.5\text{mA}\\ &I_{C}=20\text{mA},\ I_{B}=2\text{mA}\\ &V_{CE}=3\text{V},\ I_{C}=0.5\text{mA}\\ &V_{CE}=3\text{V},\ I_{C}=1\text{mA}\\ &V_{CE}=3\text{V},\ I_{C}=1\text{mA}\\ &V_{CE}=25\text{K}\Omega\\ &A_{V}=80\text{dB},\ (f=1\text{KHz}) \end{split}$	30 25 5	0.1 0.62 100 30	50 100 1000 0.2 0.7 50	V V nA nA V V MHz mV

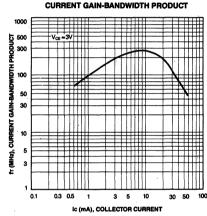
Classification	Y	G	F.	V
h _{FE}	120-240	200-400	350-700	600-1000

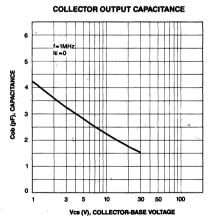


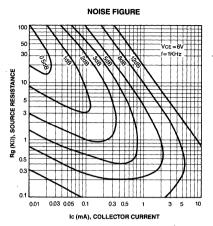


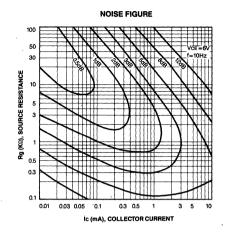


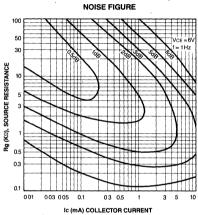










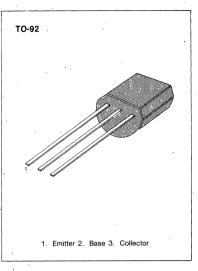


FM CONVERTER, OSCILLATOR HIGH FREQUENCY AMPLIFIER

High Current Gain Bandwidth Product f_T =250MHz (Typ)

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

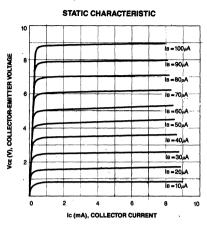
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	35	٧
Collector-Emitter Voltage	V _{CEO}	30	V
Emitter-Base Voltage	V _{EBO}	4	V
Collector Current	lc	100	mA
Collector Dissipation	Pc	200	mW
Junction Temperature	Ti	150	°C
Storage Temperature	Tstg	-55~150	°C

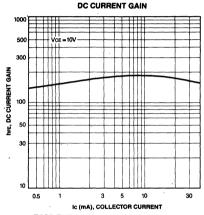


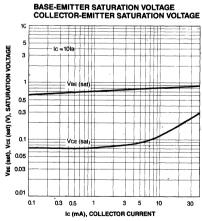
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

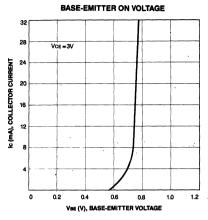
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =100μA, I _E =0	35			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 10 \text{mA}, I_{B} = 0$	30			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = -10 \mu A$, $I_C = 0$	4			V 1
Collector Cut-off Current	I _{CBO}	$V_{CB} = 20V, I_E = 0$		ĺ	0.1	μA
Emitter Cut-off Current	I _{EBO}	$V_{EB} = 3V, I_{C} = 0$			0.1	μА
Current Gain-Bandwidth Product	f _T	$V_{CE} = 10V, I_{C} = 1mA$	100	250		MHz
Output Capacitance	Cob	V _{CB} = 10V, I _E = 0 f=1MHz		2.0	3.5	рF
DC Current Gain	h _{FE}	$V_{CE} = 10V$, $I_C = 2mA$	40		240	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = 10 \text{mA}$, $I_B = 1 \text{mA}$			0.6	V
Collector-Base Time Constant	Cc rbb'	$V_{CB} = 10V, I_{E} = -1mA$ f=31.9MHz		50	75 ⁻	ps

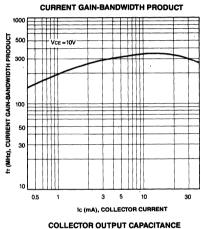
Classification	R	· o	Υ .
h _{FE}	40-80	_. 70-140	120-240

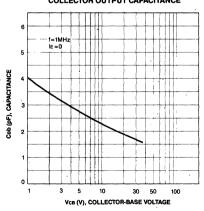










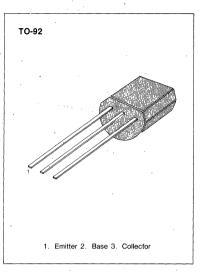


AUDIO FREQUENCY AMPLIFIER HIGH FREQUENCY OSC.

- Complement to KSA733
- Collector-Base Voltage V_{CBO} = 60V
- High Current Gain Bandwidth Product f_T = 300MHz (Typ)

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

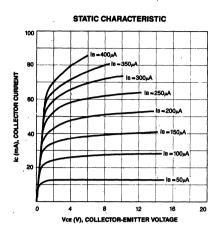
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	60	V
Collector-Emitter Voltage	V_{CEO}	50	V
Emitter-Base Voltage	V_{EBO}	5	V
Collector Current	lc	150	mA
Collector Dissipation	Pc	250	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55∼150	°C

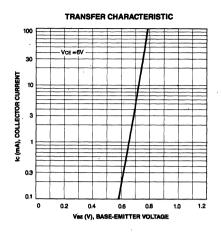


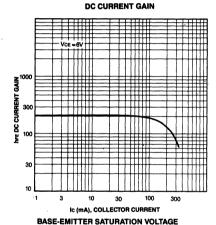
ELECTRICAL CHARACTERISTICS (Ta=25°C)

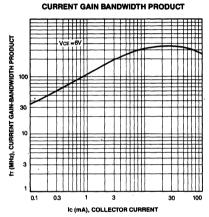
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{\rm C} = 100 \mu A, I_{\rm E} = 0$	60			·V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 10 \text{mA}, I_{B} = 0$	50	:		V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = -10\mu A$, $I_C = 0$	5			V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 40V, I_E = 0$			0.1	μA
Emitter Cut-off Current	I _{EBO}	$V_{EB} = 3V, I_{C} = 0$			Q.1	μA
DC Current Gain	h _{FE}	$V_{CE} = 6V, I_{C} = 1.0 \text{mA}$	70		700	1
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 100 \text{mA}, I_{B} = 10 \text{mA}$		0.15	0.3	V
Current-Gain-Bandwidth Product	fī	$V_{CE} = 6V, I_{C} = 10mA$		300	١.	MHz
Output Capacitance	Cob	$V_{CB} = 6V, I_E = 0$ f = 1MHz		2.5		pF
Noise Figure	NF	$V_{CE} = 6V, I_{E} = -0.5 \text{mA}$ f=1KHz, Rs = 500 Ω		4.0		dB

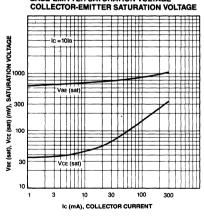
Classification	0	Y	G	L
h _{FE}	70-140	120-240	200-400	350-700

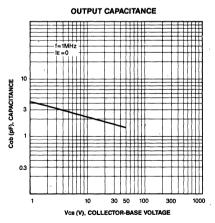










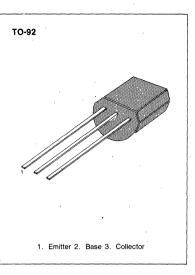


LOW FREQUENCY AMPLIFIER MEDIUM SPEED SWITCHING

- Complement to KSA708
- High Collector-Base Voltage V_{CBO} = 80V
- Collector Current Ic = 700mA
- Collector Dissipation Pc=800mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

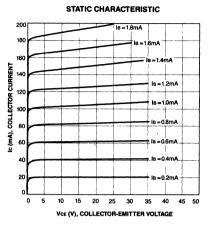
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	80	V
Collector-Emitter Voltage	V _{CEO}	60	· V
Emitter-Base Voltage	V _{EBO}	8	V
Collector Current	Ic	700	mA
Collector Dissipation	Pc	800	mW
Junction Temperature	Ti	150	°C
Storage Temperature	Tstg	-55 ~ 150	•C

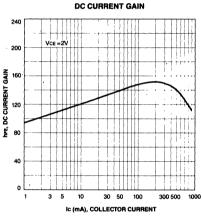


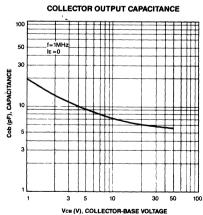
ELECTRICAL CHARACTERISTICS (Ta=25°C)

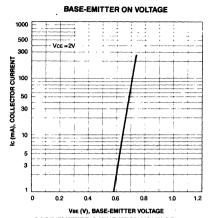
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{\rm C} = 100 \mu A, I_{\rm E} = 0$	80			v
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 10 \text{mA}, I_{B} = 0$	60			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_{\rm E} = -10 \mu A$, $I_{\rm C} = 0$	8			V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 60V, I_E = 0$			0.1	μΑ
Emitter Cut-off Current	I _{EBO}	$V_{EB} = 5V, I_{C} = 0$			0.1 ⁻	μΑ
DC Current Gain	h _{FE}	$V_{CE} = 2V, I_{C} = 50 \text{mA}$	40		400	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 500 \text{mA}, I_{B} = 50 \text{mA}$		0.2	0.4	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_{C} = 500 \text{mA}, I_{B} = 50 \text{mA}$		0.86	1.1	V
Current Gain-Bandwidth Product	f _T	$V_{CE} = 10V$, $I_{C} = 50mA$	30	50		MHz
Output Capacitance	Cob	$V_{CB} = 10V$, $I_E = 0$ f = 1MHz		8		pF

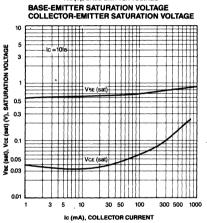
Classification	R	0	·Y	G .
h _{FE}	40-80	70-140	120-240	200-400









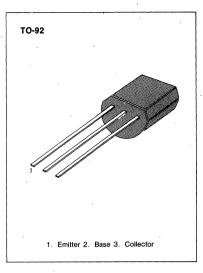


HIGH VOLTAGE AMPLIFIER

- High Collector-Base Voltage V_{CBO} = 160V
- Collector Current Ic = 700mA
- Collector Dissipation Pc = 800mW
- Complement to KSA709

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Symbol	Rating	Unit
V _{CBO}	160	V
V _{CEO}	140	V
V _{EBO}	8	V
lc	700	mA
Pc	800	mW
Ti	150	°C
Tstg	-55~150	°C
	VCBO VCEO VEBO IC Pc	V _{CBO} 160 V _{CEO} 140 V _{EBO} 8 I _C 700 P _C 800 Tj 150

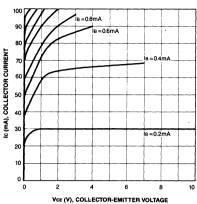


ELECTRICAL CHARACTERISTICS (Ta=25°C)

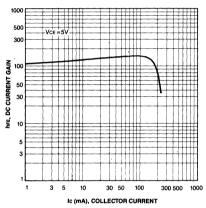
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 100 \mu A, I_{E} = 0$	160			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 10 \text{ mA}, I_{B} = 0$	140			V
Emitter-Base Breakdown Voltage	BV_{EBO}	$I_E = -10 \mu A$, $I_C = 0$	8			V
Collector Cut-off Current (Continuous)	Ісво	$V_{CB} = 60V, I_E = 0$			0.1	μA
Emitter Cut-off Current	I _{EBO}	$V_{EB} = 5V, I_C = 0$			0.1	μA
DC Current Gain	h _{EE}	$V_{CE} = 2V, I_{C} = 50mA$	40		240	1
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =200mA, I _B =20mA		0.2	0.7	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =200mA, I _B =20mA		0.86	1.0	V
Current Gain-Bandwidth Product	f _T	V _{CF} = 10V, I _C = 50mA	30	50	1	MHz
Output Capacitance	Сов	$V_{CB} = 10V, I_E = 0$ f = 1MHz		8		pF

Classification	R	0	Y	G
h _{FE}	40-80	70-140	120-240	200-400

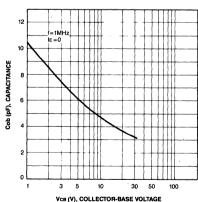
STATIC CHARACTERISTIC



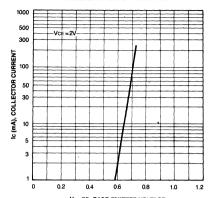
DC CURRENT GAIN



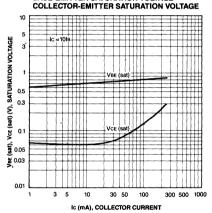
COLLECTOR OUTPUT CAPACITANCE



BASE-EMITTER ON VOLTAGE



VBE (V), BASE-EMITTER VOLTAGE **BASE-EMITTER SATURATION VOLTAGE**



KSC1070 (1)/1070 (2) NPN EPITAXIAL SILICON TRANSISTOR

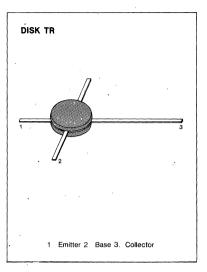
UHF TV TUNER RF AMPLIFIERLIFIER, MIXER

DISK MOLD

HIGH PG, LOW NF (PG: 18dB, NF: 2.8dB, @900MHz)

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	30	V
Collector-Emitter Voltage	V _{CEO}	25	V .
Emitter-Base Voltage	V _{EBO}	3.0	V.
Collector Current	. Ic	20 .	mA
Collector Dissipation	Pc	200	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55~150	°C.



ELECTRICAL CHARACTERISTICS (Ta=25°C)

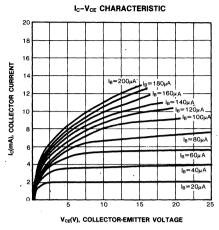
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector Cutoff Current	I _{CBO}	V _{CB} =25V, I _E =0			0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE}=10V$, $I_{C}=3mA$	40	80	200	1
Current Gain-Bandwidth Product	f⊤	$V_{CE}=10V$, $I_{E}=-3mA$	750	1000		MHz
Output Capacitance	Cob	$f=1MHz$, $V_{CB}=10V$, $I_{E}=0$		0.55	8.0	pF
Noise Figure	NF	$V_{CB}=10V$, $I_{E}=-3mA$ f=900MHz		2.8	4.0	dB
Power Gain	PG	$V_{CB}=10V$, $I_E=-3mA$ f=900MHz	14	18		dB
AGC Current: Only to C1070 (1)	I _{AGC}	I _E of PG -30dB f=900MHz	-8		-11	, mA

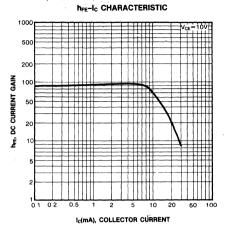
KSC1070 (1): I_{AGC} Classification P: -9~-11mA

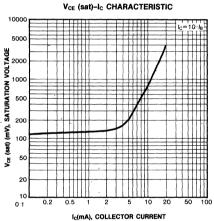
Q: -8~-10mA

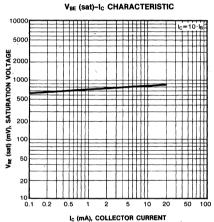
KSC1070 (2): H_{FE} Classification F: 40~200

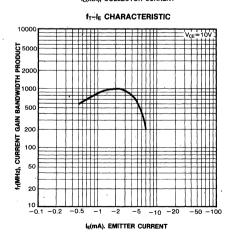
KSC1070 (1)/1070 (2) NPN EPITAXIAL SILICON TRANSISTOR

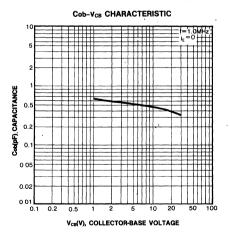




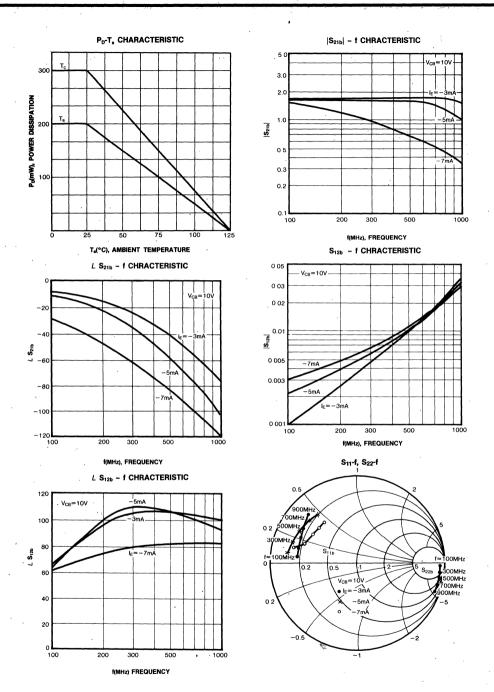


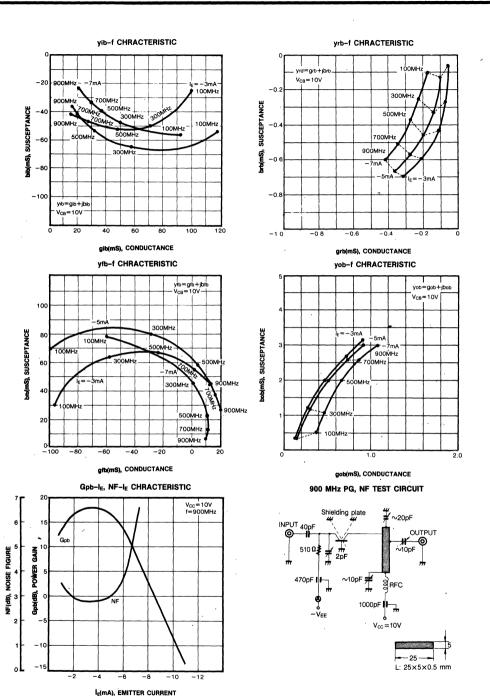






KSC1070 (1)/1070 (2) NPN EPITAXIAL SILICON TRANSISTOR



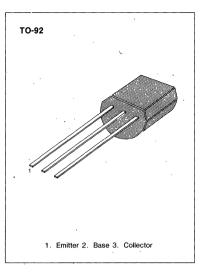


LOW FREQUENCY POWER AMPLIFIER

- Complement to KSA707
- Collector-Base Voltage V_{CBO} = 60V
- Collector Dissipation Pc=800mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

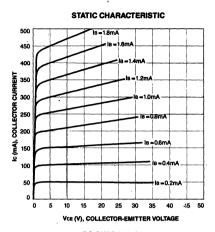
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Junction Temperature Storage Temperature	VCBO VCEO VEBO IC PC Tj	60 45 5 700 800 150 -55~150	V V V mA mW′ °C °C

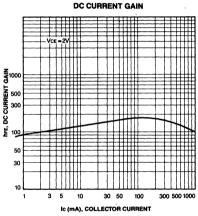


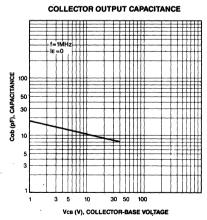
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

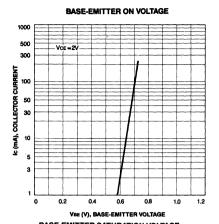
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{\rm C} = 100 \mu A, I_{\rm E} = 0$	60			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 10 \text{mA}, I_{B} = 0$	45			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = -100 \mu A$, $I_C = 0$	5			V
Collector Cut-off Current	Ісво	$V_{CB} = 40V, I_{E} = 0$			0.1	μA
Emitter Cut-off Current	I _{EBO}	$V_{EB} = 3V, I_{C} = 0$			0.1	μA
DC Current Gain	h _{FE}	$V_{CE} = 2V, I_{C} = 50 \text{mA}$	40		240	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 0.5A$, $I_{B} = 50mA$		0.24	0.4	· V
Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_{C} = 0.5A$, $I_{B} = 50mA$	0.7	0.89	1.1	: V
Output Capacitance	Cob	$V_{CB} = 10V$, $I_E = 0$ f = 1MHz		12		pF

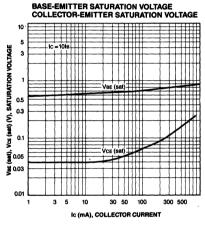
Classification	R	0	, Y
h _{FE}	40-80	70-140	120-240









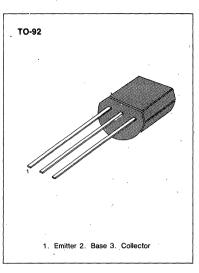


TV 1ST, 2ND PICTURE IF AMPLIFIER (FORWARD AGC)

- High Current Gain Bandwidth Product f_T =700MHz
- High Power Gain Gpe=24dB (Typ) at 45MHz

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

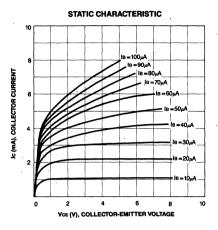
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	30	· v
Collector-Emitter Voltage	V _{CEO}	20	V
Emitter-Base Voltage	V _{EBO}	4 ·	V
Collector Current	lc	30	mA
Collector Dissipation	Pc	250	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55 ~ 150	°C

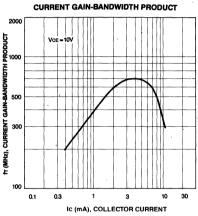


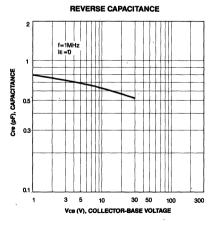
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

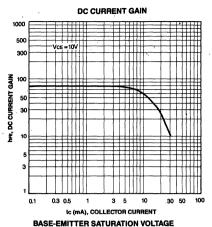
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BVCBO	I _C =10μA, I _E =0	30			ν.
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 5mA, I_{B} = 0$	20		1	V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = -10\mu A$, $I_C = 0$	4	1		V
Collector Cut-off Current	Ісво	$V_{CB} = 20V, I_{E} = 0$			0.1	μA
DC Current Gain	h _{FE}	$V_{CE} = 10V, I_{C} = 2mA$	40		240	'
Current Gain-Bandwidth Product	f⊤	$V_{CE} = 10V, I_{C} = 3mA$	400	700		MHz
Reverse Transfer Capacitance	Cre	$V_{CB} = 10V$, $I_E = 0$ f = 1MHz		0.6		pF
Power Gain	Gpe	$V_{CE} = 10V$, $I_E = -3mA$ f = 45MHz	20	24		dB
AGC Voltage	V _{AGC}	$G_{PE} = -30 dB$ f = 45 MHz	4.4	5.2	6.0	V

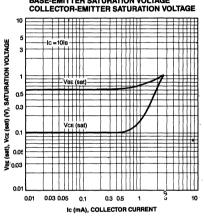
Classification	R	0	Υ
h _{FE}	40-80	70-140	120-240









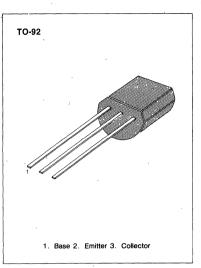


TV PIF AMPLIFIER

- High Current Gain Bandwidth Product f_T =700MHz
- High Power Gain Gpe=25dB at 45MHz (Min)

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

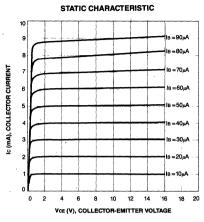
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	. 30	V
Collector-Emitter Voltage	V _{CEO}	20	V
Emitter-Base Voltage	· V _{EBO}	4	V
Collector Current	lc ·	30	mA
Collector Dissipation	Pc	250	mW
Junction Temperature	Ti	150	°C
Storage Temperature	Tstg	-55 ~ 150	°C.

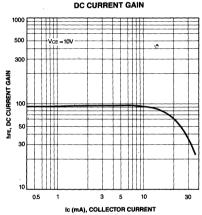


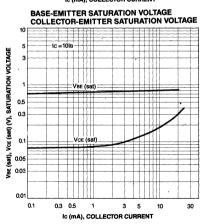
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

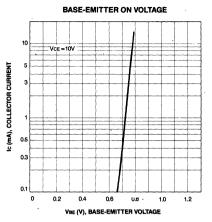
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_C = 10 \mu A, I_E = 0$	30		•	٧
Collector-Emitter Breakdown Voltage	BV _{CEO} ·	$I_{C} = 5 \text{mA}, I_{B} = 0$	20			. V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = -10 \mu A, I_C = 0$	4			V
Collector Cut-off Current	I _{CBO} -	$V_{CB} = 20V, I_{E} = 0$			0.1	μA
Emitter Cut-off Current	I _{EBO}	$V_{EB} = 3V, I_{C} = 0$			0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = 10V, I_{C} = 2mA$	40	,	240	
Current Gain-Bandwidth Product	f⊤	$V_{CE} = 10, I_{C} = 3mA$	400	700		MHz
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1mA		0.2	0.7	V
Output Capacitance	Cob	V _{CB} = 10V, I _E = 0 f=1MHz			1	pF
Power Gain	Gpe	$I_C = 10$ mA, $V_{CE} = 6$ V $f = 45$ MHz, $R_S = 50$ Ω	20	24		dB

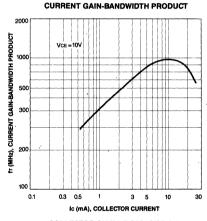
Classification	R	0	·Y
· h _{FE}	40-80	70-140	120-240

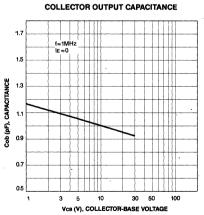










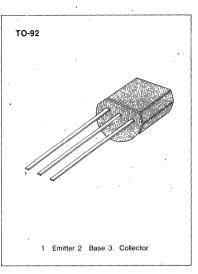


LOW FREQUENCY LOW NOISE AMPLIFIER

- Collector-Base Voltage V_{CBO} = 50V
- Low Noise Level NL=40mV (Max)

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

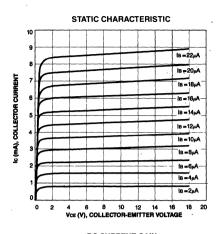
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	V
Collector-Emitter Voltage	V _{CEO}	45	V
Emitter-Base Voltage	V _{EBO}	5	V
Collector Current	l _C	50	mA
Collector Dissipation	Pc	250	mW
Junction Temperature	Ti	150	°C
Storage Temperature	Tstg	-55~150	°C

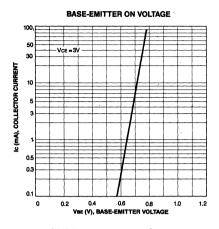


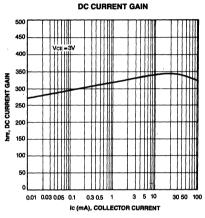
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

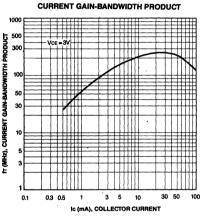
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{\rm C} = 100 \mu A, I_{\rm E} = 0$	50			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 10 \text{mA}, I_{B} = 0$	45			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = -10\mu A$, $I_C = 0$	5			V
Collector Cut-off Current	Ісво	V _{CB} =50V, I _E =0			50	nA
Emitter Cut-off Current	I _{EBO}	$V_{EB} = 5V, I_{C} = 0$			100	nA
DC Current Gain	h _{FE}	$V_{CE} = 3V, I_{C} = 0.5 \text{mA}$	120		1000	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =20mA, I _B =2mA		-0.1	0.2	V
Base-Emitter On Voltage	V _{BE} (on)	V _{CE} =3V, I _C =0.5mA		0.62	0.7	V
Current Gain-Bandwidth Product	f _T	V _{CF} =3V, I _C =1mA	50	100		MHz
Noise Level	NL	$V_{CE} = 12V, I_{E} = -0.1 \text{mA}$				1
		Rs = $25K\Omega$ A _V = $80dB$, (f=1KHz)		27	40	mV

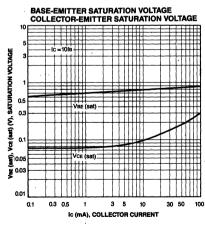
Classification	Y	G	L	´ , V
h _{FE}	120-240	200-400	350-700	600-1000

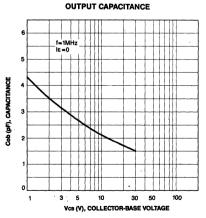


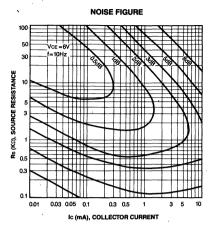


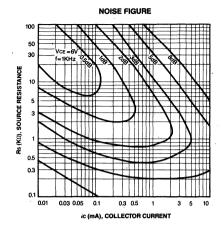


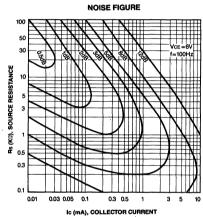










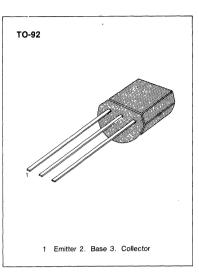


GENERAL PURPOSE AMPLIFIER

- Collector-Base Voltage V_{CBO} = 50V
- Collector Dissipation Pc = 400mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

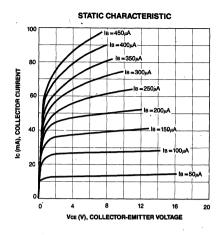
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	V
Collector-Emitter Voltage	V _{CEO}	40	. V
Emitter-Base Voltage	V _{EBO}	5	V
Collector Current	l _c	100	mA
Collector Dissipation	Pc	400	mW
Junction Temperature	Ti	150	•c
Storage Temperature	Tstg	-55 ~ 150	•c

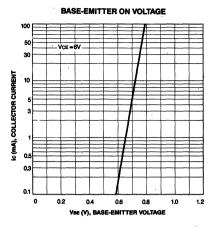


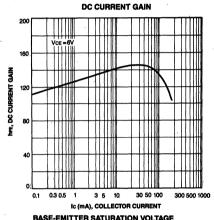
ELECTRICAL CHARACTERISTICS (Ta=25°C)

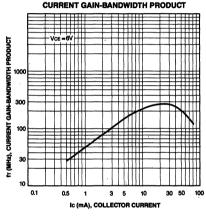
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage Collector-Emitter Breakdown Voltage Emitter-Base Breakdown Voltage Collector Cut-off Current Emitter Cut-off Current DC Current Gain Collector-Emitter Saturation Voltage Base-Emitter On Voltage Current Gain-Bandwidth Product Output Capacitance	BVcso BVcso BVsso Icso Icso Vcs (sat) Vc (son) fr Cob	$I_{C} = 100 \mu A$, $I_{E} = 0$ $I_{C} = 10 m A$, $I_{B} = 0$ $I_{E} = -10 \mu A$, $I_{C} = 0$ $V_{CB} = 40V$, $I_{E} = 0$ $V_{CB} = 3V$, $I_{C} = 0$ $V_{CE} = 6V$, $I_{C} = 1 m A$ $I_{C} = 30 m A$, $I_{B} = 3 m A$ $V_{CE} = 6V$, $I_{C} = 1.0 m A$ $V_{CB} = 6V$, $I_{C} = 10 m A$ $V_{CB} = 6V$, $I_{C} = 10 m A$ $V_{CB} = 6V$, $I_{C} = 10 m A$	50 40 5	0.08 0.62 300 2.5	0.1 0.1 400 0.50 0.80	V V ν μΑ μΑ V V MHz pF

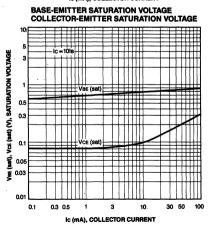
Classification	Ö	Y	G
h _{FE}	70-140	120-240	200-400

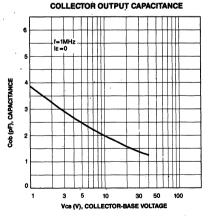










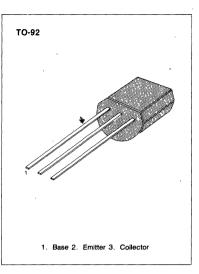


TV VHF TUNER RF AMPLIFIER (FORWARD AGC)

- High Current Gain Bandwidth Product f_T =700MHz (Typ)
- Low Noise Figure NF=3.0dB (Max) at f=200MHz
- Low Reverse Transfer Capacitance Cre=0.5pF (Max)

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

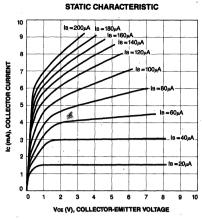
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Junction Temperature Storage Temperature	V _{CBO} V _{CEO} V _{EBO} I _C P _C Tj	30 30 4 20 250 150 -55~150	V V V mA mW °C °C

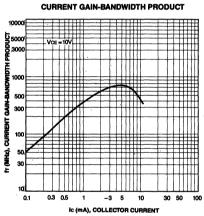


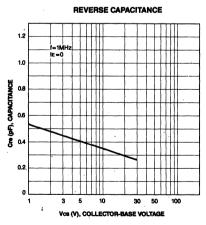
ELECTRICAL CHARACTERISTICS (Ta=25°C)

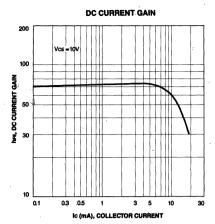
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{\rm C} = 10 \mu A, I_{\rm E} = 0$	30			V
Collector-Emitter Breakdown Voltage	BV_{CEO}	$I_{C} = 5mA, I_{B} = 0$	30			V
Emitter-Base Breakdown Voltage	BV_{EBO}	$I_E = -10\mu A$, $I_C = 0$	4			V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 20V, I_{E} = 0$			0.1	μA
DC Current Gain	h _{FE}	$V_{CE} = 10V, I_{C} = 2mA$	40		180 -	·
Current Gain-Bandwidth Product	f⊤	$V_{CE} = 10V$, $I_{C} = 3mA$	400	700		MHz
Reverse Transfer Capacitance	Cre	$f=1MHz$, $V_{CB}=10V$ $I_E=0$		0.35	0.5	pF
Power Gain	Gpe	$f = 200MH\dot{z}, I_E = -3mA$ Rs = 50 Ω , $V_{CE} = 10V$	20	24		dB
AGC Current	I _{AGC}	I _E at Gpe = -30dB f=200MHz		- 10	-12	mA
Noise Figure	NF	$f=200MHz$, $I_E=-3mA$ $V_{CE}=10V$, $R_S=50\Omega$		2.0	3.0	dB

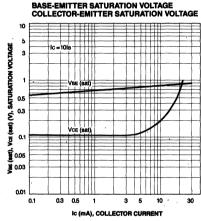
Classification	R	0	Y
h _{FE}	40-80	60-140	90-180

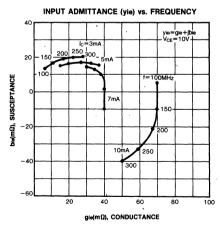


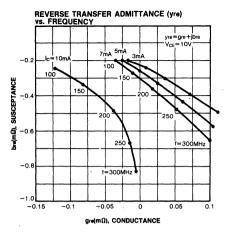


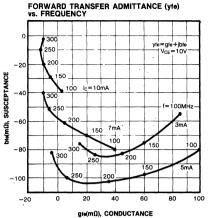


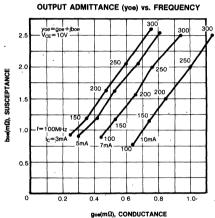


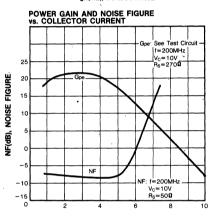






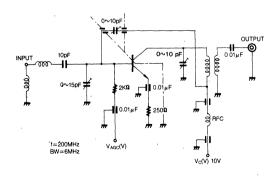






Ic(mA), COLLECTOR CURRENT

POWER GAIN AND NOISE FIGURE TEST CIRCUIT

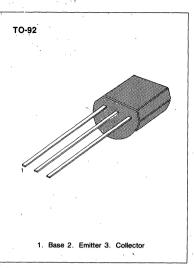


TV VHF TUNER MIXER

- High Current Gain Bandwidth Product f_T =700MHz (Typ)
- High Power Gain Gpe=20dB (Min) at f=200MHz
- Low Noise Figure NF=3.5dB (Max) at f=200MHz

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

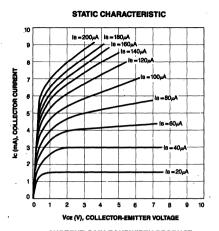
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	30	V
Collector-Emitter Voltage	V _{CEO}	30	V
Emitter-Base Voltage	V _{EBO}	· 4	V
Collector Current	I _C	20	mA
Collector Dissipation	Pc	250	mW
Junction Temperature	Ti	150	°C
Storage Temperature	Tstg	-55 ~ 150	°C

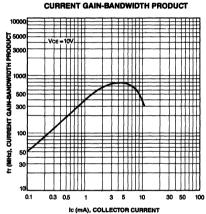


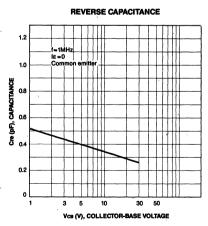
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

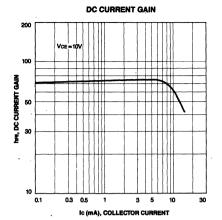
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 10 \mu A, I_{E} = 0$	30			٧
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{\rm C} = 5 {\rm mA}, I_{\rm B} = 0$	30			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = -10 \mu A$, $I_C = 0$	4	1.		V
Collector Cut-off Current	Ісво	$V_{CB} = 20V, I_{E} = 0$			0.1	μA
DC Current Gain	h _{FE}	$V_{CE} = 10V, I_{C} = 2mA$	40		180	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = 10 \text{mA}, I_B = 1 \text{mA}$			0.7	V
Current Gain-Bandwidth Product	f _T	$V_{CE} = 10V, I_{C} = 3mA$	400	700		MHz
Reverse Transfer Capacitance	Cre	$V_{CB} = 10V, I_{E} = 0$		0.35	0.5	pF
		f=1MHz.	* '			
Power Gain	Gpe	$V_{CE} = 6V, I_{E} = -3mA$	20			dB
		Rs =50Ω, f=200MHz				,
Noise Figure	NF ·	$V_{CF} = 6V, I_F = -3mA$			3.5	dB
	•	Rs =50Ω, f=200MHz				

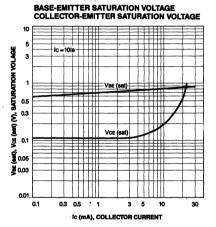
Classification	R	0	Y
h _{FE}	40-80	60-140	90-180









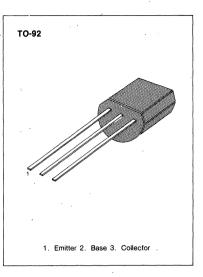


TV VHF TUNER OSCILLATOR

- High Current-Gain Bandwidth Product f_T = 600MHz (Min)
- Output Capacitance Cob=1.5pF (Max)

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

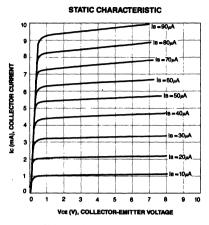
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	30	V
Collector-Emitter Voltage	V _{CEO}	15	V
Emitter-Base Voltage	V _{EBO}	4	V
Collector Current	· lc	20	mA
Collector Dissipation	Pc	250	mW
Junction Temperature	Tj	150	,°C
Storage Temperature	Tstg	-55~150	°C

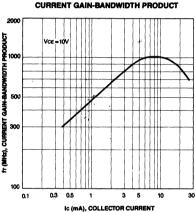


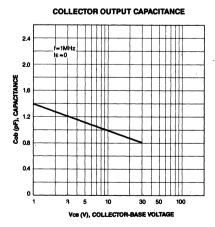
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

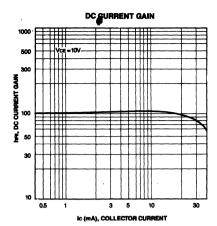
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 10 \mu A, I_{E} = 0$	30			ν
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 5mA, I_{B} = 0$	15		ļ	V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = -10\mu A$, $I_C = 0$	4 .			V
Collector Cut-off Current	Ісво	$V_{CB} = 12V, I_E = 0$			0.1	μA
Emitter Cut-off Current	I _{EBO}	$V_{EB} = 3V, I_C = 0$			0.1	V
DC Current Gain	h _{FE}	$V_{CE} = 10V, I_{C} = 5mA$	40		240	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = 10 \text{mA}, I_B = 1 \text{mA}$			0.5	V
Current-Gain-Bandwidth Product	f _T	$V_{CE} = 10V, I_{C} = 5mA$	600	1100		MHz
Output Capacitance	Cob	$V_{CB} = 10V, f = 1MHz$			1.5	pF
		I _E = 0				

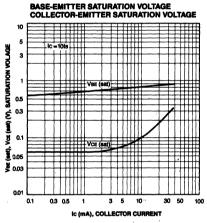
Classification	R	0	ΥΥ
h _{FE}	40-80	70-140	120-240









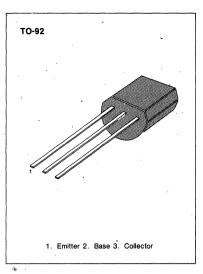


HIGH VOLTAGE TRANSISTOR

- High Collector-Emitter Voltage V_{CEO} = 300V
- Current Gain Bandwidth Product f_T = 40MHz (Min)

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

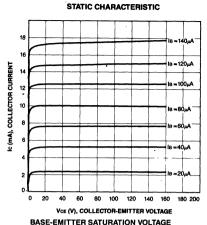
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	300	٧
Collector-Emitter Voltage Emitter-Base Voltage	V _{CEO} V _{EBO}	300 7	V
Collector Current	Ic	100	mA
Collector Dissipation	Pc	700	mW
Junction Temperature	Tj	150 55 150	°C °C
Storage Temperature	Tstg	−55 ~ 150	30

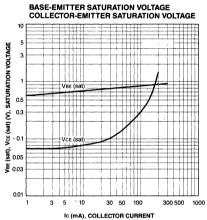


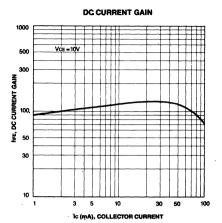
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

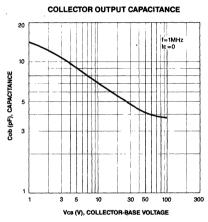
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =100μA, I _E =0	300			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 10 \text{mA}, I_{B} = 0$	300			V
Emitter-Base Breakdown Voltage	BV _{FBO}	$I_E = -10\mu A$, $I_C = 0$	7			V
Collector Cutoff Current	I _{CBO}	V _{CB} = 200V, I _E = 0			100	nA
DC Current Gain	h _{EE}	$V_{CE} = 10V$, $I_{C} = 10mA$	40		240	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =50mA, I _B =5mA	1		2.0	l v
Current Gain-Bandwidth Product	f _T	$V_{CE} = 30V$, $I_{C} = 10mA$	40	80		МН
Output Capacitance	Cob	$V_{CB} = 50V, I_{E} = 0$ f = 1MHz		4		pF

Classification	R	0	Y
h _{FE}	40-80	70-140	120-240







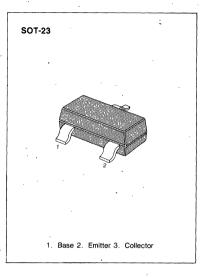


LOW FREQUENCY AMPLIFIER HIGH FREQUENCY OSC

• Complement to KSA812

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	, V _{CBO}	60	V
Collector-Emitter Voltage	V _{CEO}	50	V
Emitter-Base Voltage	V_{EBO}	. 5	ν
Collector Current	l _C	100	·mA
Collector Dissipation	Pc	200	mW
Junction Temperature	Ti	150	°C
Storage Temperature	Tstg	-55~150	°C



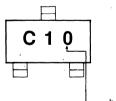
ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector Cutoff Current	I _{CBO}	V _{CB} =60V, I _E =0			0.1	μА
Emitter Cutoff Current	I _{EBO}	V _{EB} =5V, I _C =0			01	μA
DC Current Gain	h _{FE}	V _{CE} =6V, I _C =1mA	. 90	200 .	600	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =100mA, I _B =10mA		0.15	0.3	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =100mA, I _B =10mA	ľ	0.86	· 1.0	V
Base-Emitter On Voltage	V _{BE} (on)	I _C =1mA, V _{CE} =6V	0.55	0.62	0.65	V
Current Gain-Bandwidth Product	f _T	I _E = - 10mA V _{CF} =6V		250		MHz
Output Capacitance	Cob	Vc8=6V, IE=0		3		pF
•		t=1MHz				1

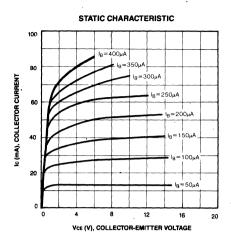
hFE CLASSIFICATION

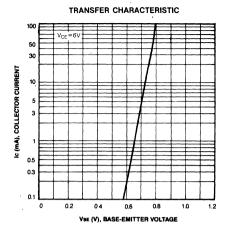
Classification	0	Υ	G	L
h _{FE}	90-180	135-270	200-400	300-600

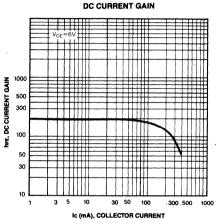
Marking

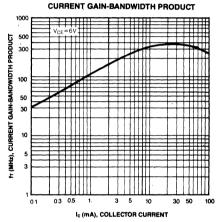


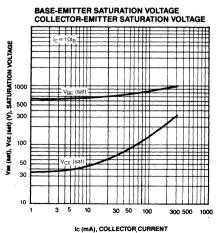
 h_{FE} grade

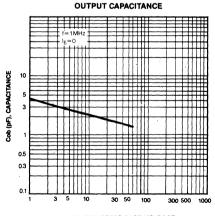










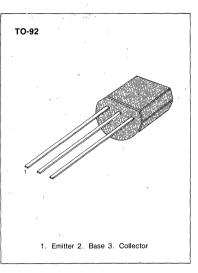


TV PIF AMPLIFIER, FM TUNER RF AMPLIFIER, MIXER, OSCILLATOR

- High Current-Gain-Bandwidth Product f_T =600MHz (Typ)
- High Power Gain Gpe=22dB at f=100MHz

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

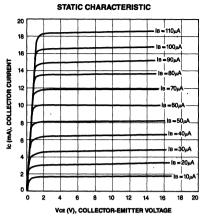
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	30	٧
Collector-Emitter Voltage	V _{CEO}	20	V
Emitter-Base Voltage	V _{EBO}	4	V
Collector Current	Ic	20	mA
Collector Dissipation	Pc	250	mW
Junction Temperature	Tj.	150	°C
Storage Temperature	Tstg	-55 ~ 150	°C

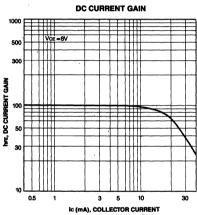


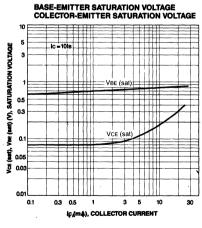
ELECTRICAL CHARACTERISTICS (Ta=25°C)

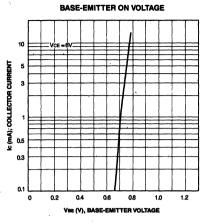
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 10 \mu A, I_{E} = 0$	30			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 5 \text{mA}, I_{B} = 0$	20			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = -10 \mu A$, $I_C = 0$	4			V
Collector Cut-off Current	I _{CBO}	V _{CB} =30V, I _E =0			0.1	μA
Emitter Cut-off Current	I _{EBO}	$V_{EB} = 4V, I_{C} = 0$			0.1	μA
DC Current Gain	h _{FE}	$V_{CE} = 6V$, $I_{C} = 1mA$	40		240	l '
Base-Emitter On Voltage	V _{BE} (on)	V _{CE} =6V, I _C =1mA		0.72		V
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1mA		0.1	0.3	V
Current-Gain-Bandwidth Product	f _T	$V_{CE} = 6V_{1}I_{C} = 1mA$	400	600		MHz
Output Capacitance	Cob	V _{CB} =6V, I _E =0		1.2		pF
		f=1MHz				"
Collector-Base Time Constant	Cc rbb'	$V_{CE} = 6V, I_{E} = -1mA$ f=31.9MHz		12	15	ps
Common Source Noise Figure	NF '	$V_{CE} = 6V, I_{E} = -1mA$ Rs = 50 Ω . f = 100MHz		3.0	5.0	dB
Power Gain	Gpe	$V_{CE} = 6V$, $I_E = -1mA$ Rs = 50Ω , f=100MHz (Typ)	18	22		dB .

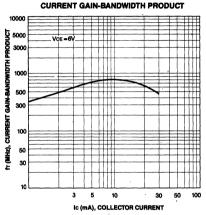
Classification	R	0	Y
h _{FE}	40-80	70-140	120-240

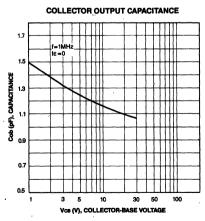


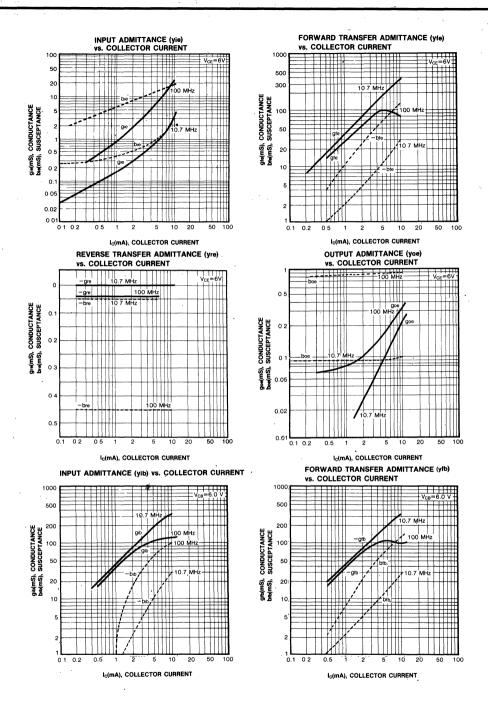


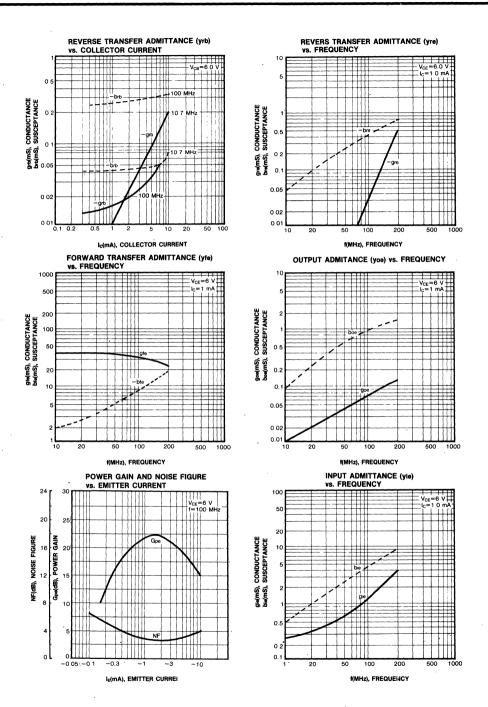




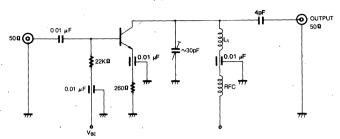








100MHz Gpe, NF TEST CIRCUIT

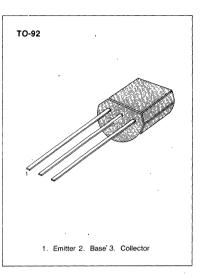


FM/AM RF AMP, MIX, CONV, OSC, IF

- Collector-Base Voltage V_{CEO} = 30V
- High Current Gain Bandwidth Product f_T =300MHz (Typ)
- Low Collector Capacitance Cob: 2.0PF (Typ)

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

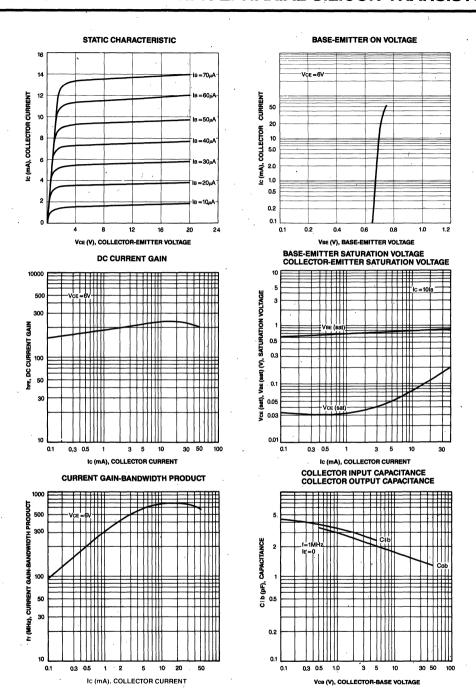
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Junction Temperature Storage Temperature	V _{CBO} V _{CEO} V _{EBO} I _C P _C Tj	50 30 5 50 250 150 -55~150	V V WA mW



ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{\rm C} = 10 \mu A, I_{\rm E} = 0$	50			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 5 \text{mA}, I_{B} = 0$	30			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	5			V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 50V, I_E = 0$			0.1	μΑ
Emitter Cut-off Current	I _{EBO}	$V_{EB} = 5V, I_{C} = 0$			0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = 6V, I_{C} = 1mA$	40		240	1
Base-Emitter On Voltage	V _{BE} (on)	$V_{CE} = 6V$, $I_c = 1mA$		0.67	0.75	V
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = 10 \text{mA}, I_B = 1 \text{mA}$		0.08	0.3	V
Current Gain-Bandwidth Product	f _T	$V_{CE} = 6V, I_{C} = 1mA$	150	300		MHz
Output Capacitance	Cob	f=1MHz, V _{CB} =6V		2.0	2.5	PF

Classification	R	0	Y
h _{FE}	40-80	70-140	120-240

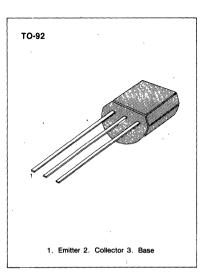


TV VHF, UHF TUNER OSCILLATOR

- High Current Gain Bandwidth Product f_T =1100MHz (Typ)
- Output Capacitance Cob=1.5pF (Max)

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

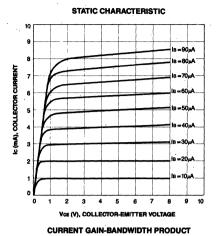
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	30	V
Collector-Emitter Voltage	V _{CEO}	15	V
Emitter-Base Voltage	V _{EBO}	. 5	V
Collector Current	Ic	50	mA
Collector Dissipation	Pc	250	mW
Junction Temperature	Tį	150	°C
Storage Temperature	Tstg	−55 ~ 150	°C



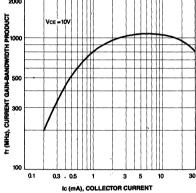
ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Conditions	Min	. Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{\rm C} = 10 \mu A, I_{\rm E} = 0$	30			, V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{\rm C} = 5 {\rm mA}, \ I_{\rm B} = 0$	15			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = -10\mu A$, $I_C = 0$	5			V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 12V, I_{E} = 0$			0.1	μA
DC Current Gain	h _{FE} .	$V_{CE} = 10V, I_{C} = 5.0mA$	40		240	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = 10 \text{mA}, I_B = 1 \text{mA}$			0.5	V
Current Gain-Bandwidth Product	f _T	$V_{CE} = 10V, I_{C} = 5mA$	800	1100		MHz
Output Capacitance	Cob	$V_{CB} = 10V$, $f = 1MHz$ $I_E = 0$			1.5	рF
Collector-Base Time Constant	Cc·rbb'	$V_{CE} = 10V$, f=31.9MHz $I_{E} = -0.5$ mA		. 10	20	ps

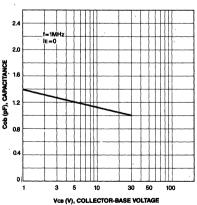
Classification	R	0	Y
h _{FE}	40-80	70-140	120-240



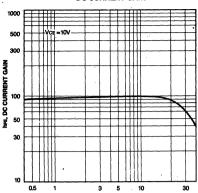




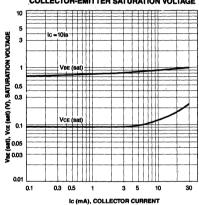
OUTPUT CAPACITANCE



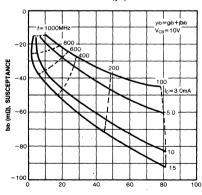
DC CURRENT GAIN



ic (mA), COLLECTOR CURRENT BASE-EMITTER SATURATION VOLTAGE COLLECTOR-EMITTER SATURATION VOLTAGE

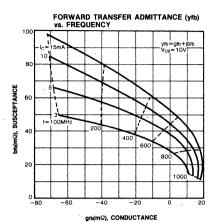


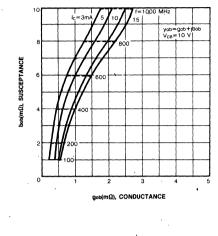
INPUT ADMITTANCE (yib) vs. FREQUENCY

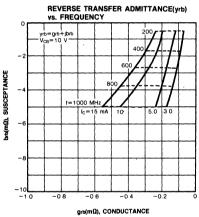


gib(mΩ), CONDUCTANCE

OUTPUT ADMITTANCE (yob) vs. FREQUENCY





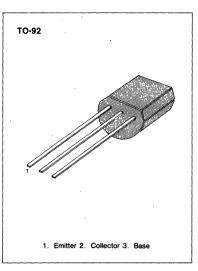


AUDIO FREQUENCY LOW NOISE AMPLIFIER

• Complement to KSA992

ABSOLUTE MAXIMUM RATINGS (T_a=25°C)

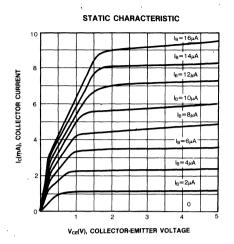
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	120	V
Collector-Emitter Voltage	V_{CEO}	120	· V
Emitter-Base Voltage	V _{EBO}	5	V
Collector Current	l _C	50	mA
Base Current	l _B	10	mA
Collector Dissipation	Pc	500	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55 ~ 150	°C

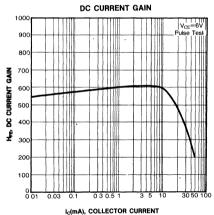


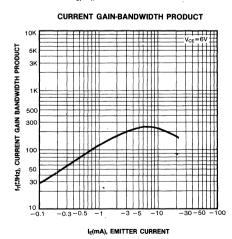
ELECTRICAL CHARACTERISTICS (Ta=25°C)

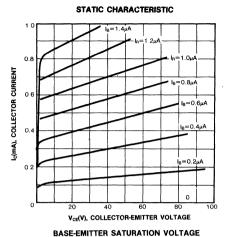
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector Cutoff Current	I _{CBO}	V _{CB} =120V, I _E =0			50	nA
Emitter Cutoff Current	I _{EBO}	V _{EB} =5V, I _C =0			50	nA
DC Current Gain	h _{FE1}	$V_{CE} = 6V, I_{C} = 0.1 \text{mA}$	150	580		
	h _{FE2}	$V_{CE}=6V$, $I_{C}=1mA$	200	600	1200	
Base Emitter On Voltage	V _{BE} (on)	$V_{CE}=6V$, $I_{C}=1mA$	0.55	0.59	0.65	V
Collector Emitter Saturation Voltage	V _{CE} (sat)	$I_C=10mA$, $I_B=1mA$		0.07	0.3	ν
Current Gain Bandwidth Product	f _T	$V_{CE}=6V$, $I_{E}=-1$ mA	50	110		MHz
Output Capacitance	Cob	$V_{CB} = 30V, I_{E} = 0$		1.6	2.5	pF
	1	f=1MHz	1			
Noise Voltage	NV			25	40	mV

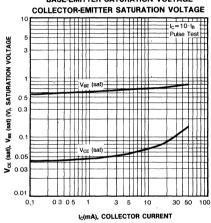
Classification	Р	F	E	U
h _{FE} (2)	200-400	300-600	400-800	600-1200

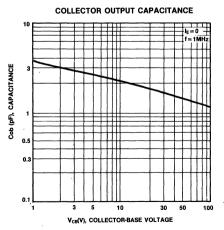


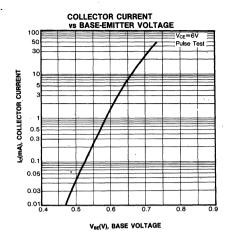


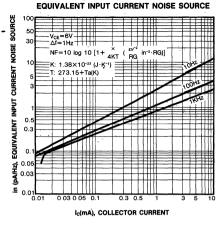


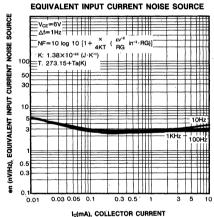


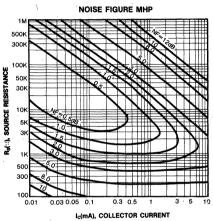


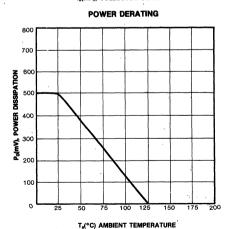










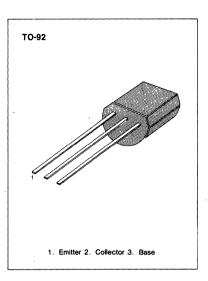


GENERAL PURPOSE APPLICATIONS HIGH TOTAL POWER DISIPATION (PT=600 mW)

High hee and LOW Vce(sat)

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	30	V
Collector-Emitter Voltage	V _{CEO}	25	V
Emitter-Base Voltage	V _{EBO}	5	V
Collector Current	lc	700	mA
Base Current	l _B	150	mA
Collector Dissipation	Pc	600	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55~150	°,C



ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Condition	Min	. Тур	Max	Unit
*Base Emitter Voltage	V _{BE}	V _{CE} =6V, I _C =10mA	600	640	700	mV
Collector Cutoff Current	I _{CBO}	$V_{CB} = 30V, I_{E} = 0$			100	nA
Emitter Cutoff Current	I _{EBO}	$V_{EB}=5V$, $I_{C}=0$			100	nA
*DC Current Gain	h _{FE} 1	V _{CE} =1V, I _C =100mA	90	200	400	
	h _{FE} 2	V _{CE} =1V, I _C =700mA	50	140		
*Collector Emitter Saturation Voltage	V _{CE} (sat)	I _C =700mA, I _B =70mA		0.2	0.6	V
*Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =700mA, I _B =70mA		0.95	1.2	V
Output Capacitance	C _{ob}	$V_{CB}=6V$, $I_E=0$, $f=1MHz$		13	25	pF
Curent Gain Bandwidth Product	f⊤	$V_{CE}=6V$, $I_{E}=10mA$	50	170		MHz

^{*} Pulse test: PW ≤ 350 μs, duty cycle ≤ 2% Pulsed

hee1 CLASSIFICATION

Classification	R·	0	Y
h _{FE} 1	90-180	135-270	200-400

AUDIO FREQUENCY AMPLIFIER

• Complement to KSA953/KSA954

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage : KSC2002	V _{CBO}	60	V
; KSC2003		80	V
Collector-Emitter Voltage : KSC2002	V _{CEO}	60	V
: KSC2003	-	80	٧
Emitter-Base Voltage	V _{EBO}	5	V
Collector Current (DC)	l _C	300	mΑ
*Collector Current (Pulse)	Ic	500	mA
Collector Dissipation	Pc	600	mW
Junction Temperature	Tj .	150	°C
Storage Temperature	Tstg	-55~150	°C
	l l		ì

ELECTRICAL CHARACTERISTICS (Ta=25°C)

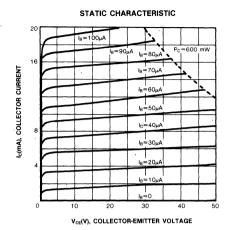
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector Cutoff Current: KSC2002	Ісво	V _{CB} =60V, I _E =0			100	nA
: KSC2003		V _{CB} =80V, I _E =0			100	nA
Emitter Cutoff Current	I _{EBO}	$V_{EB}=5V$, $I_{C}=0$			100	nA
*DC Current Gain	h _{FE1}	V _{CE} =1V, I _C =50mA	90	200	400	
	h _{FE2}	V _{CE} =2V, I _C =300mA	30	80		
Base-Emitter On Voltage	V _{BE} (on)	$V_{CE}=6V$, $I_{C}=10mA$	600	645	700	mV
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =300mA, I _B =30mA		0.15	0.6	V
* Base Emitter Saturation Voltage	V _{BE} (sat)	I _C =300mA, I _B =30mA		0.86	1.2	V
Current Gain-Bandwidth Product	f⊤	$V_{CE}=6V$, $I_{E}=-10mA$	50	140		MHz
Output Capacitance	Cob	$V_{CB}=6V$, $I_E=0$, $f=1MHz$. 7	15	pF

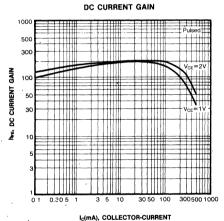
^{*} Pulse Test: PW≤350µs, Duty Cycle≤2% Pulsed

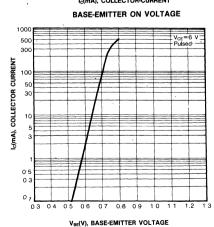
Classification	0	, Y	G
h _{FE} (1)	90-180	135-270	200-400

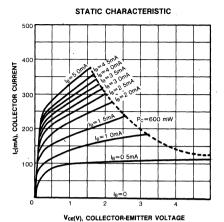
TO-92

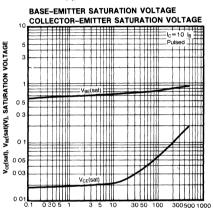
PW≤10ms, Duty Cycle ≤50%

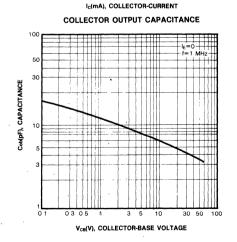


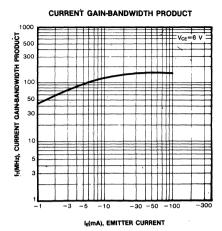


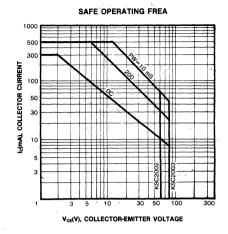


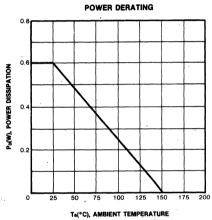












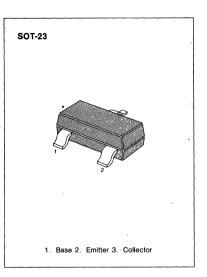
HIGH FREQUENCY AMPLIFIER

Very small size to assure good space factor in hybrid IC applications

- $f_T = 600MHz$ Typ. $(I_E = -1mA)$
- Cob=1pF Typ (V_{CB}=6V)
- NF=3dB Typ (f=100MHz)

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	30	V
Collector-Emitter Voltage	V _{CEO}	20	V
Emitter-Base Voltage	V _{EBO}	4	V
Collector Current	l _C	20	mA
Collector Dissipation	Pc	150	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55∼150	°C



ELECTRICAL CHARACTERISTICS (Ta=25°C)

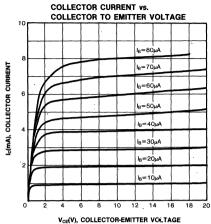
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector Cutoff Current DC Current Gain	I _{CBO}	$V_{CB}=30V, I_{E}=0$ $V_{CE}=6V, I_{C}=1mA$	40	90	0.1 180	μΑ
Collector Emitter Saturation Voltage	h _{FE} V _{CE} (sat)	I _C =10mA, I _B =1mA	40	0.1	0.3	v
Output Capacitance Current Gain Bandwidth Product	Cob .	$V_{CB}=6V$, $I_{E}=0$, $f=1MHz$ $V_{CE}=6V$, $I_{C}=-1mA$	400	600		pF MHz
Time Constant	Cc·rbb	$V_{CB}=6V$, $I_E=-1$ mA f=31.9MHz		12		ps
Noise Figure	NF	$V_{CE} = 6V$, $I_E = -1 \text{ mA}$ $f = 100 \text{MHz}$, $R_S = 50 \Omega$		3		dB

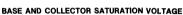
h_{FE} CLASSIFICATION

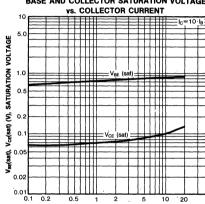
.[Classification	R	0	Y
	h _{FE}	40-80	60-120	90-180



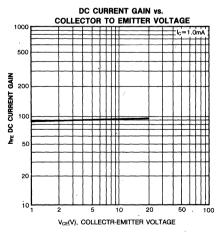
h_{FE} grade

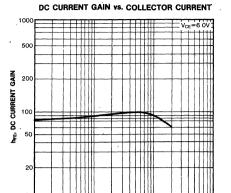






Ic(mA), COLLECTOR CURRENT

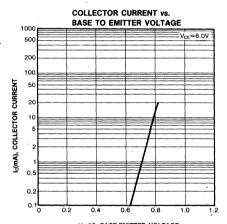




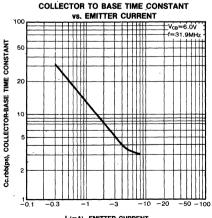
Ic(mA), COLLECTOR CURRENT

10 20

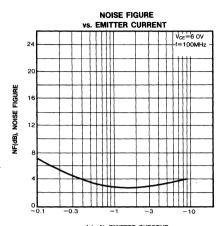
0.2 0.5



VBE(V), BASE-EMITTER VOLTAGE

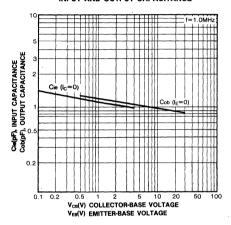


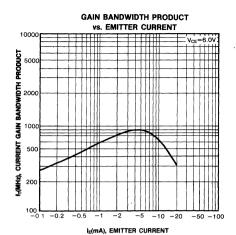
I_E(mA), EMITTER CURRENT



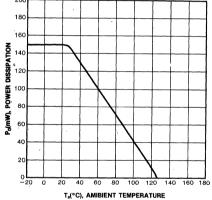
$I_{E}(mA)$, EMITTER CURRENT









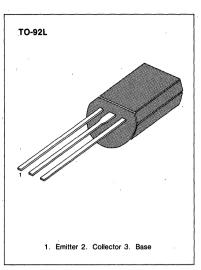


HIGH VOLTAGE POWER AMPLIFIER

- Collector Base Voltage V_{CBO} = 200V
- Current Gain-Bandwidth Product f_T = 100MHz (Typ)

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

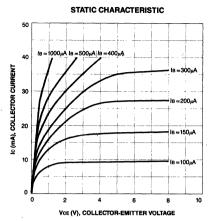
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	200	٧
Collector-Emitter Voltage	V _{CEO}	150	V
Emitter-Base Voltage	V _{EBO}	5 .	V
Collector Current	Ic	50	mA
Collector Dissipation	Pc	800	mW
Junction Temperature	Tj	150	.°C
Storage Temperature	Tstg	-55~+150	°C

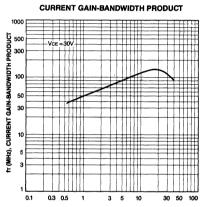


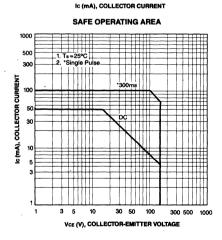
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

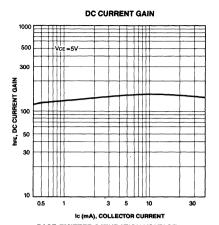
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{\rm C} = 100 \mu A, I_{\rm E} = 0$	200			v
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 5mA$, $I_{B} = 0$	150			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_{\rm E} = -100 \mu A$, $I_{\rm C} = 0$	5			V
Collector Cut-off Current	Ісво	V _{CB} = 200V, I _E = 0			0.1	μА
DC Current Gain	h _{EE}	V _{CE} = 5V, I _C = 10mA	40		- 240	1
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = 10mA$, $I_B = 1mA$			0.5	V
Current Gain-Bandwidth Product	fτ	$V_{CE} = 30V, I_{C} = 10mA$		100		MHz
Output Capacitance	Cob	V _{CB} = 10V, I _E = 0 f=1KHz		3.5	5	pF

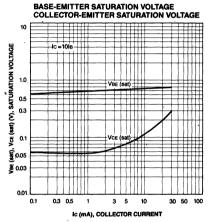
Classification	R	0	Y	
h _{FE}	40-80	70-140	120-240	

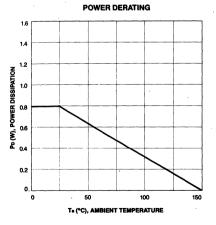










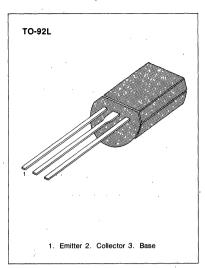


AUDIO POWER AMPLIFIER APPLICATIONS

- Driver Stage Amplifier
- Complement to KSA916

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

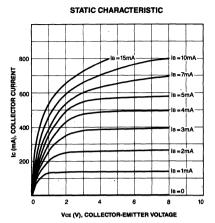
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	120	V
Collector-Emitter Voltage	V _{CEO}	120	V
Emitter-Base Voltage	V _{EBO}	5	V
Collector Current	Ic	. 800	mA
Collector Dissipation	Pc	900	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55 ~ +150	. ℃

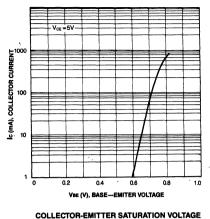


ELECTRICAL CHARACTERISTICS (Ta=25°C)

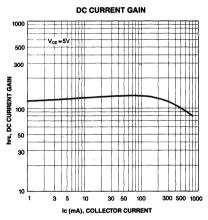
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =1mA, I _E =0	1,20			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 10 \text{ mA}, I_{B} = 0$	120			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_{E} = -1 \text{mA}, I_{C} = 0$	5			V
Collector Cutoff Current	I _{CBO}	V _{CB} = 120V, I _E = 0			0.1	μA
DC Current Gain	h _{FE1}	$V_{CE} = 5V, I_{C} = 10mA$	60			
	h _{FE2′}	$V_{CE} = 5V, I_{C} = 100mA$	80		240	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 500 \text{mA}, I_{B} = 50 \text{mA}$			1	V
Current-Gain-Bandwidth Product	f _T	$V_{CE} = 5V, I_{C} = 100mA$		120		MHz
Collector Output Capacitance	Cob	V _{CB} =10V, I _E =0			30	pF
	,	f=1MHz				

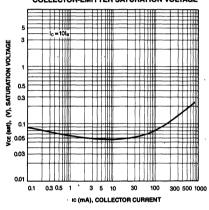
Classification	0	Y
h _{FE} (2)	80-160	120-240

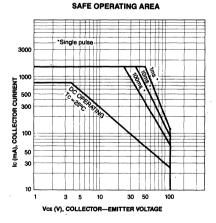


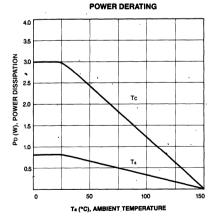


BASE-EMITTER ON VOLTAGE







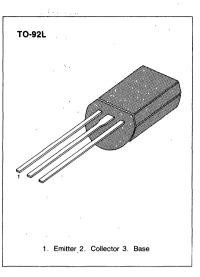


AUDIO POWER AMPLIFIER APPLICATIONS

- Complement to KSA928A
- Collector Dissipation Pc=1 Watt
- 3 Watt Output Application

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

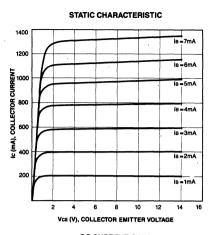
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	30	; v
Collector-Emitter Voltage	V _{CEO}	30	V
Emitter-Base Voltage	V _{EBO}	5	V
Collector Current	l _C	2	Α
Collector Dissipation	Pc	√ 1	w
Junction Temperature	Ti	150	•c
Storage Temperature	Tstg	-55~+150	•c
		i	l .

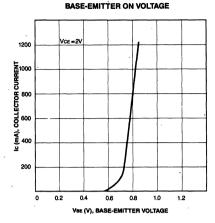


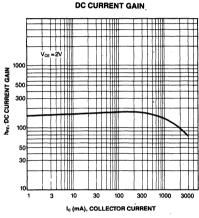
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

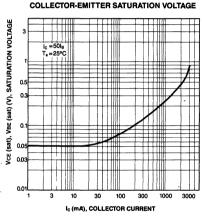
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage Collector-Emitter Breakdown Voltage Emitter-Base Breakdown Voltage Collector Cutoff Current Emitter Cutoff Current DC Current Gain Base-Emitter On Voltage Collector-Emitter Saturation Voltage Current Gain-Bandwidth Product Output Capacitance	BVCBO BVCEO BVEBO ICBO IEBO hFE VBE (ON) VCE (sat) fT COb	$I_C = 100 \mu A$, $I_E = 0$ $I_C = 10 mA$, $I_B = 0$ $I_E = -1 mA$, $I_C = 0$ $V_{CB} = 30 V$, $I_E = 0$ $V_{CE} = 5 V$, $I_C = 0$ $V_{CE} = 2 V$, $I_C = 500 mA$ $V_{CE} = 2 V$, $I_C = 500 mA$ $I_C = 1.5 A$, $I_B = 0.03 A$ $V_{CB} = 10 V$, $I_C = 0$, $I_C $	30 30 5	120 30	100 100 320 1.0 2.0	V V NA NA V V MHz pF

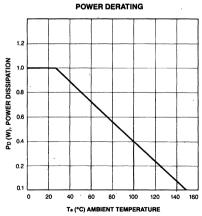
Classification	o	Υ
h _{FE}	100-200	160-320

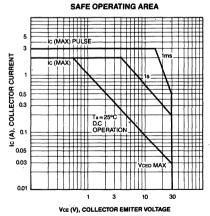










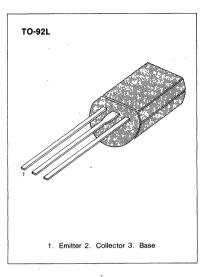


COLOR TV CHROMA OUTPUT

- Collector-Base Voltage V_{CBO} = 300V
- Current Gain-Bandwidth Product f_T = 50MHz (Typ)

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

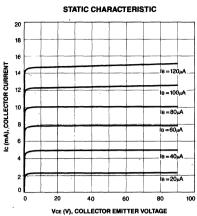
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	300	V
Collector-Emitter Voltage	V _{CEO}	300	V
Emitter-Base Voltage	V _{EBO}	7	V
Collector Current	lc	100	mA
Collector Dissipation	Pc	1	w
Junction Temperature	Ті.	150	•c
Storage Temperature	Tstg	-55~+150	°C

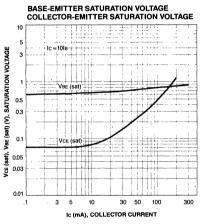


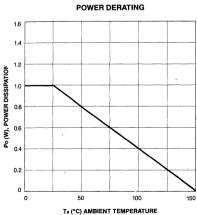
ELECTRICAL CHARACTERISTICS (Ta=25°C)

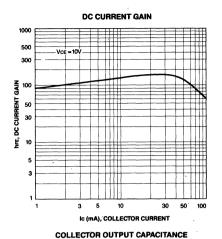
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 100 \mu A, I_{E} = 0$	300			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 5mA, I_{B} = 0$	300			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_{\rm E} = -100 \mu A$, $I_{\rm C} = 0$	7			V
Collector Cut-off Current	I _{CBO}	V _{CB} = 200V, I _E = 0			0.1	μΑ
DC Current Gain	h _{FF}	$V_{CE} = 10V, I_{C} = 20mA$	40		240	'
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1mA			0.5	V
Current Gain-Bandwidth Product	fr	$V_{CE} = 30V, I_{C} = 10mA$		50		МН
Output Capacitance	Cob	V _{CB} = 10V, I _E = 0 f = 1MHz		4		pF

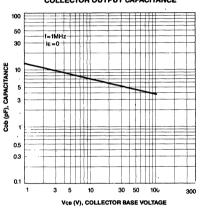
Classification	R	0	Y
h _{FE}	40-80	70-140	120-240









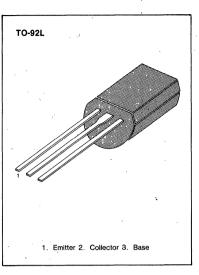


LOW FREQUENCY AMPLIFIER MEDIUM SPEED SWITCHING

- Complement to KSA931
- High Collector-Base Voltage V_{CBO} = 80V
- Collector Current Ic = 700mA
- Collector Dissipation Pc=1W

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

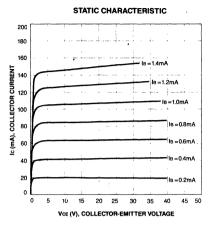
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	80	V
Collector-Emitter Voltage	V _{CEO}	60	V
Emitter-Base Voltage	V _{EBO}	8	V
Collector Current	l _C	700 .	mA
Collector Dissipation	Pc	1	. w
Junction Temperature	Ti	150	•c
Storage Temperature	Tstg	-55~+150	°C

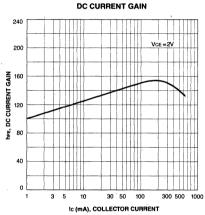


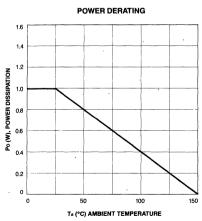
ELECTRICAL CHARACTERISTICS (Ta=25°C)

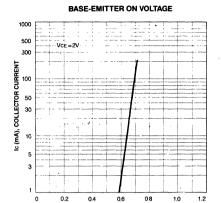
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 100 \mu A, I_{E} = 0$	80			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =10mA, I _B =0	60		,	V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = -10\mu A$, $I_C = 0$	8			V
Collector Cut-off Current	Ісво	V _{CB} = 60V, I _E = 0			0.1	μA
Emitter Cut-off Current	I _{EBO}	V _{EB} = 5V, I _C = 0			0.1	μA
DC Current Gain	h _{FE}	V _{CE} = 2V, I _C = 50mA	40		240	'
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =500mA, I _B =50mA		0.2	0.7	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =500mA, I _B =50mA		0.86	1.20	. v
Current-Gain-Bandwidth Product	fr	$V_{CE} = 10V, I_{C} = 50mA$	30	50		MHz
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1MHz	,	8		pF

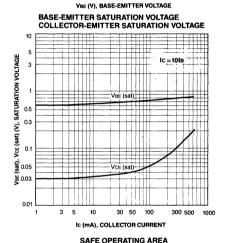
Classification	0	Y
h _{FE}	70-140	120-240

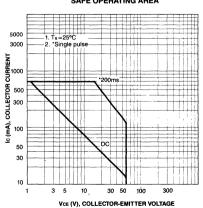










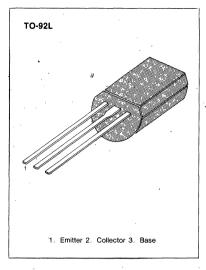


COLOR TV CHROMA OUTPUT

- Collector-Base Voltage V_{CBO} = 350V
- Current Gain-Bandwidth Product f_T = 50MHz (Typ)

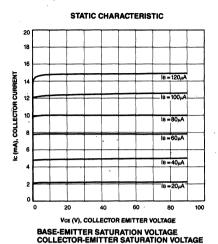
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	350	٧
Collector-Emitter Voltage	V _{CEO}	350	V
Emitter-Base Voltage	V _{EBO}	. 7	V
Collector Current	l _c	100	mA
Collector Dissipation	Pc	1	W
Junction Temperature	Ti	150	°C
Storage Temperature	Tstg	−55 ~ 150	°C.

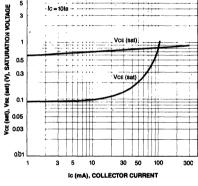


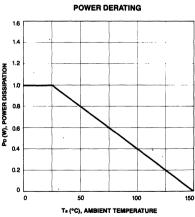
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

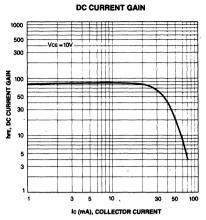
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =100μA, I _E =0	350			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C = 5mA$, $I_B = 0$	350			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$l_E = -100 \mu A$, $l_C = 0$	7			V
Collector Cutoff Current	I _{CBO}	$V_{CB} = 200V, I_E = 0$			0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = 10V, I_{C} = 20mA$	30		150	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 10 \text{mA}, I_{B} = 1 \text{mA}$			0.5	V
Current Gain Bandwidth Product	fτ	$V_{CF} = 10V, I_C = 20mA$. 50			MHz
Output Capacitance	Cob	$V_{CB} = 10V$, $I_E = 0$, $f = 1MHz$		8 -		pF

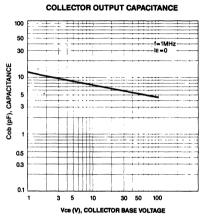








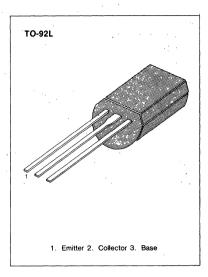




COLOR TV AUDIO OUTPUT COLOR TV VERTICAL DEFLECTION OUTPUT

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

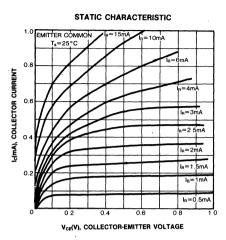
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	160	V
Collector-Emitter Voltage	V _{CEO}	160	V
Emitter-Base Voltage	V _{EBO}	6	V
Collector Current	l _c	1	Α
Base Current	l _B	0.5	Α
Collector Dissipation	Pc	900	mW
Junction Temperature	Tj	-150	°C
Storage Temperature	Tstg	-55∼150	°C

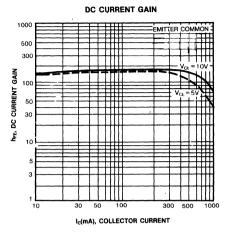


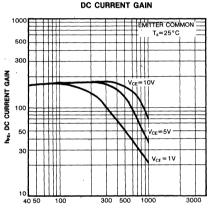
ELECTRICAL CHARACTERISTICS (Ta=25°C)

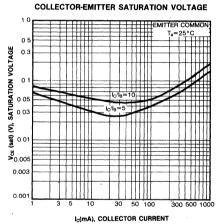
Characteristic	Symbol	Test Condition	Min	Тур	· Max	Unit
Collector Cutoff Current	I _{CBO}	V _{CB} =150V, I _E =0			1	μΑ
Emitter Cutoff Current	I _{EBO}	$V_{EB} = 6V, I_{C} = 0$			1	μΑ
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C=10mA$, $I_B=0$	160			v
DC Current Gain	h _{FE}	$V_{CE} = 5V$, $I_{C} = 200mA$	60		320	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =500mA, I _B =50mA	*		1.5	V
Base Emitter On Voltage	V _{BL} (on)	$V_{CE}=5V$, $I_{C}=5mA$	0.45		0.75	V
Current Gain-Bandwidth Product	f⊤	$V_{CE} = 5V, I_{C} = 200mA$	20	100		MHz
Output Capacitance	Cob	$V_{CB} = 10V, I_E = 0, f = 1MHz$,	20	pF

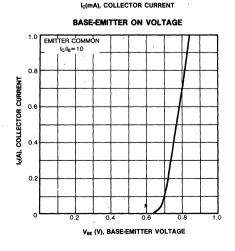
Classification	R	. 0	Υ
h _{FE}	60-120	100-200	160-320

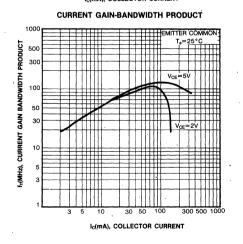




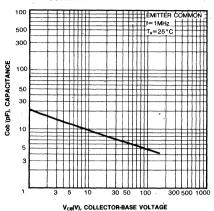




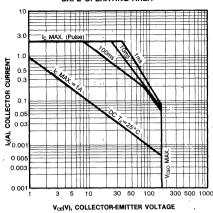








SAFE OPERATING AREA

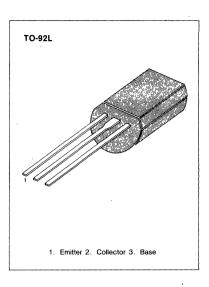


MEDIUM POWER AMPLIFIER LOW SATURATION

• V_{CE} (sat)=0.5V (I_{C} =2A, I_{B} =50mA)

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	30	V
Collector-Emitter Voltage	V _{CES}	30	V
Collector-Emitter Voltage	• V _{CEO}	10	V
Emitter-Base Voltage	V _{EBO}	6	V
Collector Current (DC)	l _C	2	Α
*Collector Current (Pulse)	l _C	5	Α
Base Current	l _B	0.5	Α
Collector Dissipation	Pc	900	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55∼150	°C

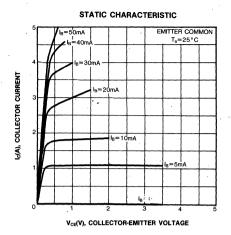


ELECTRICAL CHARACTERISTICS (Ta=25°C)

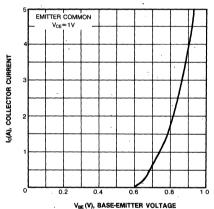
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector Cutoff Current	I _{CBO}	$V_{CB} = 30V, I_{E} = 0$			100	. nA
Emitter Cutoff Current	I _{EBO}	$V_{EB} = 6V, I_{C} = 0$			100	nA
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 10 \text{mA}, I_{B} = 0$	10			V
Emitter Base Breakdown Voltage	BV _{EBO}	$I_E = 1 \text{ mA}, I_C = 0$	6			V
DC Current Gain	h _{FE1}	V _{CE} =1V, I _C =0.5A	140		600	
	h _{FE2}	$V_{CE}=1V$, $I_{C}=2A$	70	200		
Collector Emitter Saturation Voltage	V _{CE} (sat)	$I_{C}=2A$, $I_{B}=50mA$		0.2	0.5	V
Base Emitter On Voltage	V _{BE} (on)	$V_{CE}=1V$, $I_{C}=2A$		0.86	1.5	V
Current Gain Bandwidth Product	f⊤	$V_{CE} = 1V$, $I_{C} = 0.5A$		150		MHz
Output Capacitance	Cob	$V_{CB} = 10V$, $I_E = 0$, $f = 1MHz$		27		pF

Classification	A	В	С	D
h _{FE} (1)	140-240	200-330	300-450	420-600

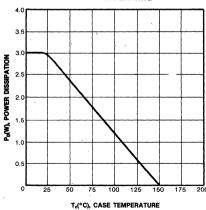
^{*} PW≤10ms, Duty Cycle≤30%



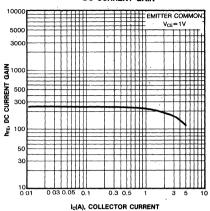




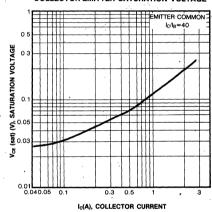
POWER DERATING



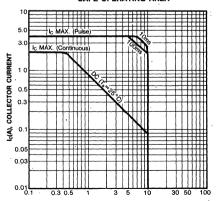
DC CURRENT GAIN



COLLECTOR-EMITTER SATURATION VOLTAGE



SAFE OPERATING AREA



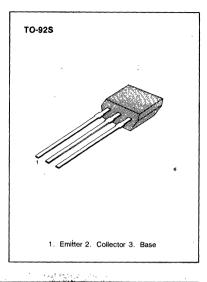
VCE(V), COLLECTOR-EMITTER VOLTAGE

FM RADIO RF AMP, MIX, CONV, OSC, IF AMP

• High Current Gain Bandwidth Product f_T =250MHz (Typ)

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

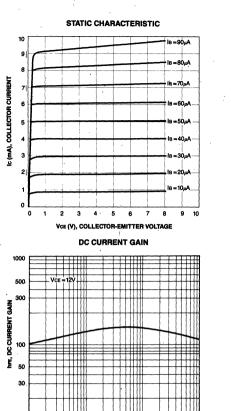
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage	V _{CBO}	35 30	V
Emitter-Base Voltage	V _{EBO}	4	v
Collector Current Collector Dissipation	I _C P _C	30 200	mA mW
Junction Temperature Storage Temperature	Tj Tstg	150 −55∼150	°C

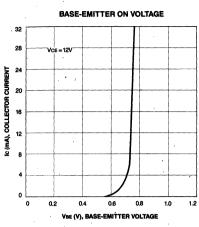


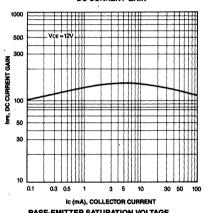
ELECTRICAL CHARACTERISTICS (Ta=25°C)

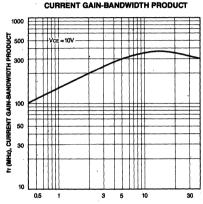
Symbol	Test Condition	Min	Тур	Max	Unit
BV _{CBO}	$I_{C} = 100 \mu A, I_{E} = 0$	35			V
BV _{CEO}	$I_{C} = 5mA, I_{B} = 0$	30			V
BV _{EBO}	$I_E = -10 \mu A$, $I_C = 0$	4	}		V
I _{CBO}	$V_{CB} = 30V, I_{E} = 0$		'	0.1	μΑ
I _{EBO}	$V_{EB} = 4V, I_{C} = 0$			0.1	μA
h _{FE}	$V_{CE} = 12V, I_{C} = 2mA$	40		240	1
V _{BE} (on)	$V_{CE} = 6V$, $I_{C} = 1mA$	0.65	0.70	0.75	V
V _{CE} (sat)	$I_C = 10 \text{mA}$, $I_B = 1 \text{mA}$		0.1	0.4	V
f _T	$V_{CE} = 10V, I_{C} = 1mA$	100	250		MHz
Cob	$V_{CB} = 10V$, $I_E = 0$ f = 1MHz		2.0	3.2	pF
	BVCBO BVCEO BVEBO ICBO IEBO hFE VBE (ON) VCE (Sat) fT	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$

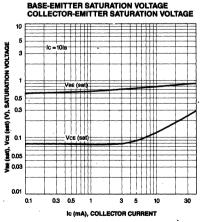
Classification	. R	. 0	γ ·
h _{FE}	40-80	70-140	120-240

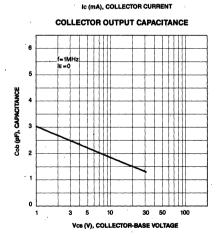










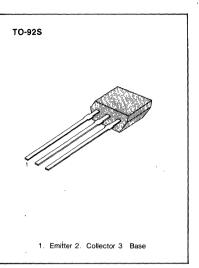


LOW FREQUENCY, POWER AMPLIFIER

- Complement to KSA1150
- Collector Dissipation Pc = 300mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

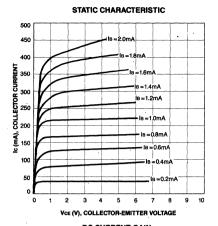
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	40	V
Collector-Emitter Voltage	V _{CEO}	20	V
Emitter-Base Voltage	V _{EBO}	- 5	V
Collector Current	Ic	500	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Ti	150	•C
Storage Temperature	Tstg	-55 ~ 150	°C

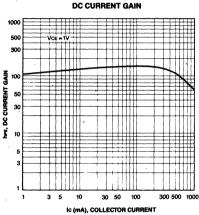


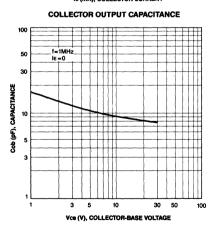
ELECTRICAL CHARACTERISTICS (Ta=25°C)

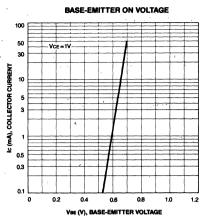
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 100 \mu A, I_{E} = 0$	40			V.
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 10 \text{mA}, I_{B} = 0$	20			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = -100 \mu A$, $I_C = 0$	5		·	V
Collector Cut-off Current	Ісво	$V_{CB} = 25V, I_{E} = 0$			0.1	μA
Emitter Cut-off Current	I _{EBO}	$V_{EB} = 3V, I_{C} = 0$			0.1	μA
DC Current Gain	h _{FE}	$V_{CE} = 1V, I_{C} = 0.1A$	40		400	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = 0.5A$, $I_B = 0.05A$		0.18	0.4	, V

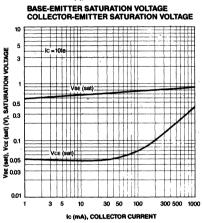
Classification	R	0	Υ	G
h _{FE}	40-80	70-140	120-240	200-400









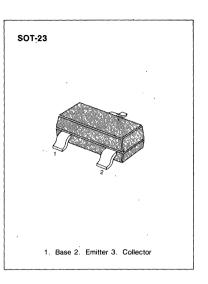


FM RADIO AMP, MIX, CONV OSC, IF AMP

• High Power Gain Gpe = 30dB

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

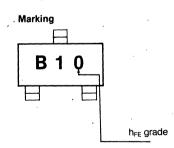
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation	V _{CBO} V _{CEO} V _{EBO} I _C P _C	35 30 4 50	V V V mA mW
Junction Temperature Storage Temperature	Tj Tstg	150 -55~150	°C

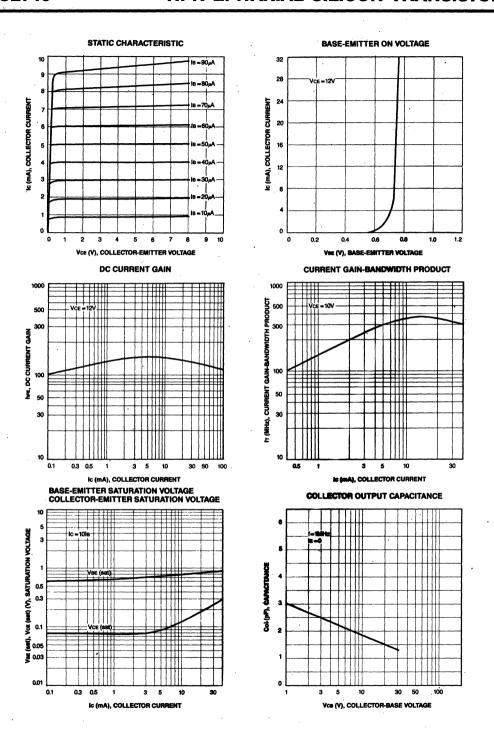


ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector Cutoff Current	І _{сво}	V _{CB} =35V, I _E =0			0.1	μА
Emitter Cutoff Current	I _{EBO}	V _{EB} =4V, I _C =0		ľ	1	μA
DC Current Gain	h _{FE}	$V_{CE}=12V$, $I_{C}=2mA$	40		240	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1mA			0.4	V
Base-Emitter Saturation	V _{BE} (sat)	I _C =10mA, I _B =1mA			1.0	V
Current Gain-Bandwidth Product	f _T	I _C =1mA, V _{CE} =10V	100		400	MHz
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1MHz		2.	3.2	pF
Power Gain	Gpe	$V_{CE}=6V, I_{E}=-1mA$ f=10.7MHz	27	30	33	dB

Classification	R	0	· Y
h _{FE} .	40-80	70-140	120-240



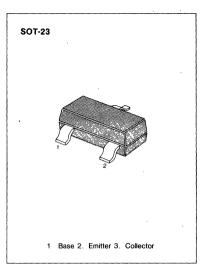


MIXER, OSC. FOR UHF TV TUNER

High f_T: 3.5GHz (TYP)

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

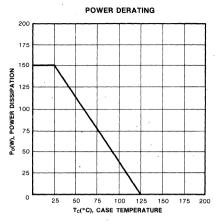
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage	V _{CBO}	20 12	V
Emitter-Base Voltage Collector Current (DC)	V _{EBO}	3 50	MA
Collector Dissipation Junction Temperature Storage Temperature	P _C Tj Tstg	150 125 −55∼125	°C °C

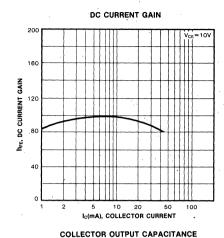


ELECTRICAL CHARACTERISTICS (Ta=25°C)

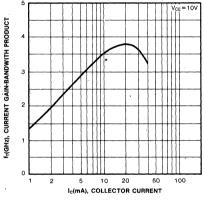
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C}=10\mu A, I_{E}=0$	20			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =1mA, R _{BE} =∞	12			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$. 3			V
Collector Cutoff Current	I _{CBO}	$V_{CB} = 15V, I_E = 0$			700	nA
DC Current Gain	h _{FE}	$V_{CE}=10V$, $I_{C}=5mA$	20	90	200	
Collector Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =5mA			0.7	V
Current Gain Bandwidth Product	f _T	V _{CE} =10V, I _C =10mA	1.4	3.5		GHz
Output Capacitance	Cob	$V_{CB} = 10V$, $I_E = 0$, $f = 1MHz$		0.9	1.5	pF
	1	I	l	1	1	I

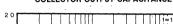


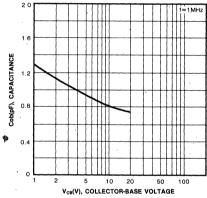




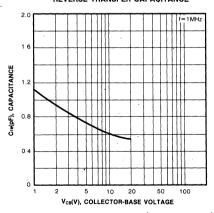




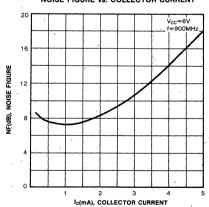


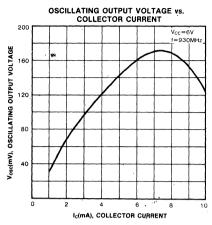


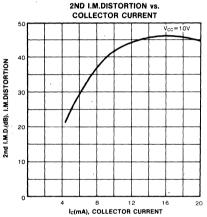
REVERSE TRANSFER CAPACITANCE

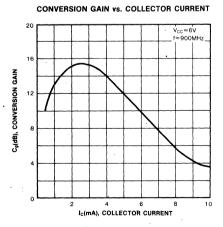


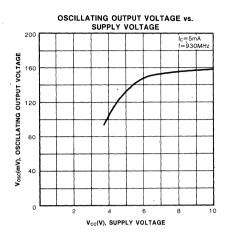
NOISE FIGURE vs. COLLECTOR CURRENT

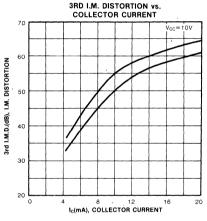


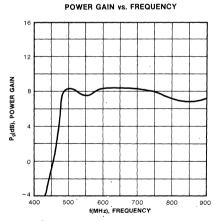










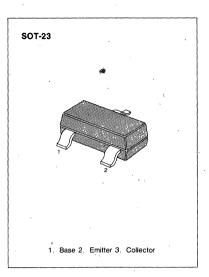


RF AMP, FOR VHF TV TUNER

- . LOW NF, HIGH Gpe
- NF=2.0dB Typ. Gpe=23dB Typ. (f=200MHz)
- FORWARD AGC CAPABILITY TO 30 dB

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Symbol	Rating	Unit
V _{CBO} V _{CEO} V _{EBO} I _C P _C Tj	30 30 5 20 150	V V WA mW °C °C
	V _{CBO} V _{CEO} V _{EBO} I _C P _C	V _{CBO} 30 V _{CEO} 30 V _{EBO} 5 I _C 20 P _C 150 Tj 150

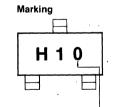


ELECTRICAL CHARACTERISTICS (Ta=25°C)

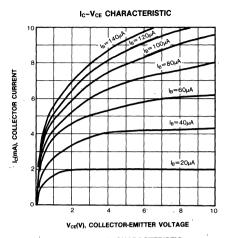
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector Cutoff Current	I _{CBO}	V _{CB} =20V, I _E =0	,		Ö.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =10V, I _C =3mA	60	120	240	
Current Gain Bandwidth Product	f⊤	$V_{CE} = 10V, I_{C} = -3mA$	400	600		MHz
Reverse Transfer Capacitance	Cre	$f=1MHz$, $V_{CB}=10V$, $I_E=0$		0.3	0.5	pF
Power Gain	Gpe	f=200MHz, I _c =3mA	20	23		dB
AGC Current	I _{AGC}	f=200MHz		-10	-12	mA
		I _E of Gpe -30dB				
Noise Figure	NF	f=200MHz, l _c =3mA		2.0	3.0	dB

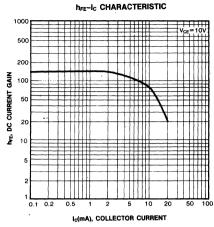
h_{FE} CLASSIFICATION

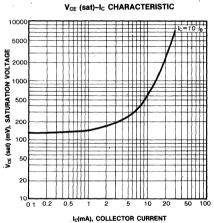
Classification	R	0	Y	
h _{FE}	60-120	90-180	120-240	

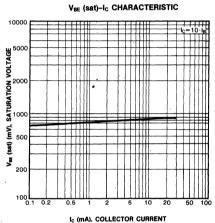


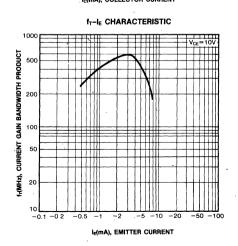
 h_{FE} grade

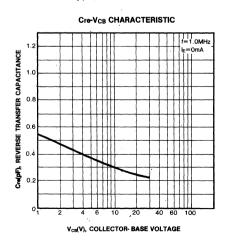


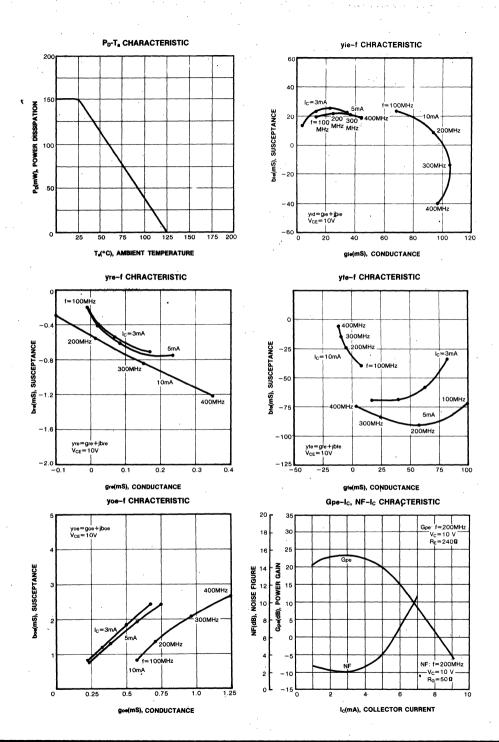




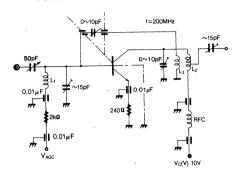








POWER GAIN AND NOISE FIGURE TEST

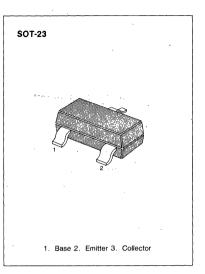


MIXER FOR VHF TV TUNER

• HIGH Gce (Typ. 23dB)

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

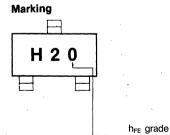
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Junction Temperature Storage Temperature	VCBO VCEO VEBO Ic Pc Tj	30 20 4 30 150 150 -55~150	V V V mA mW °C °C

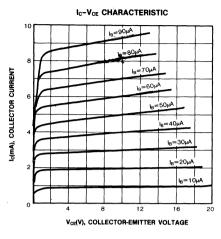


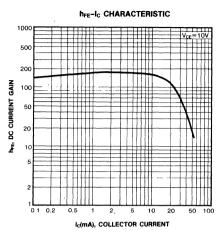
ELECTRICAL CHARACTERISTICS (Ta=25°C)

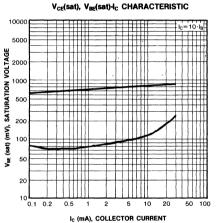
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector Cutoff Current	I _{CBO}	V _{CB} =20V, I _E =0	,		0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE}=10V$, $I_{C}=5mA$	60	120	240	
Collector Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1mA			0.5	V
Current Gain Bandwidth Product	f _T	$V_{CE}=10V$, $I_{E}=-5mA$	500	850		MHz
Reverse Transfer Capacitance	Cre	$V_{CB}=10V$, $I_E=0$, $f=1MHz$		0.35	0.5	pF
Conversion Gain	Gce	$V_{CE}=10V$, $I_{C}=3mA$	15	23		dB
	İ	f _{RF} =200MHz, I _F =58MHz			-	
Noise Figure	NF	$v_{CE}=10V$, $I_{C}=3mA$		6.5		dB
		f _{RF} =200MHz, I _F =58MHz				

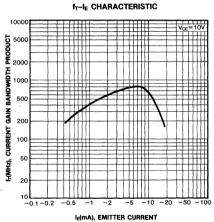
Classification	R	o	Y	
h _{FE}	60-120	90-180	120-240	

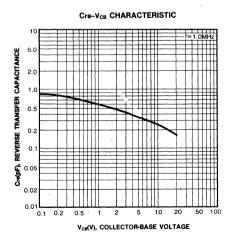


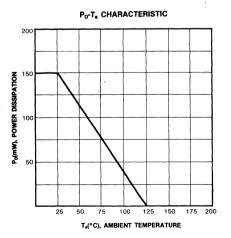


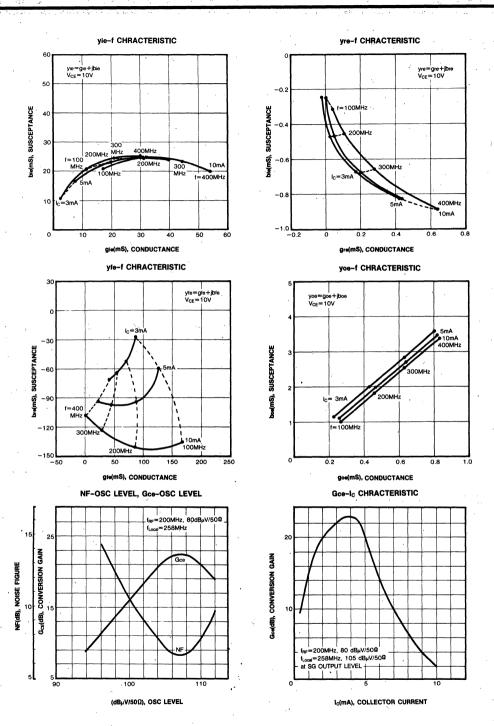










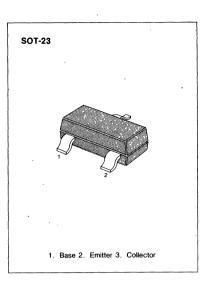


MIXER OSCILLATOR FOR VHF TUNER

HIGH f_T ($f_T = 1100MHz$ Typ.)

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

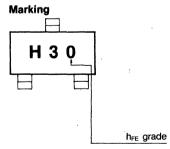
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	30	V
Collector-Emitter Voltage	V _{CEO}	15	V
Emitter-Base Voltage	V _{EBO}	. 5	V
Collector Current	lc	50	mA
Collector Dissipation	Pc	150	mW
Junction Temperature	Ti	150	°C
Storage Temperature	Tstg	-55~150	°C

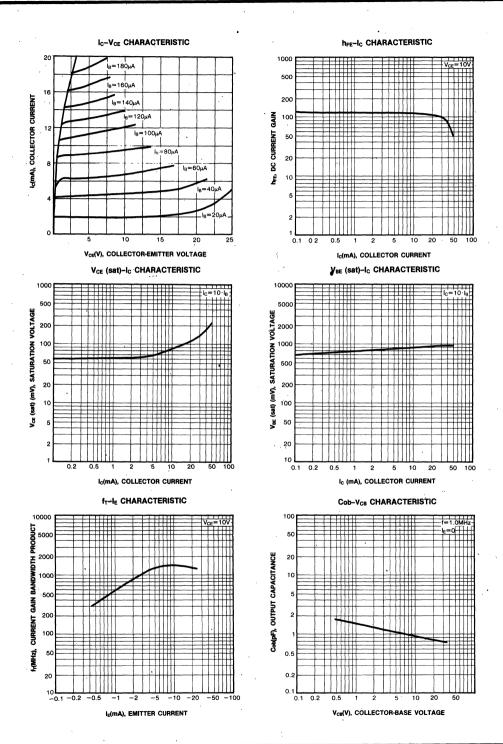


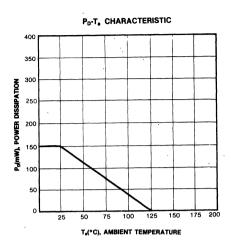
ELECTRICAL CHARACTERISTICS (Ta=25°C)

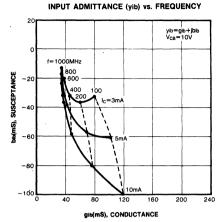
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector Cutoff Current	I _{CBO}	V _{CB} =12V, I _E =0			0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =10V, I _C =5mA	60	120	240	
Collector Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1mA			0.5	· v
Current Gain Bandwidth Product	f _T	$V_{CE} = 10V, I_{E} = -5mA$	800	1100		MHz
Output Capacitance	Cob	f=1MHz, V _{CB} =10V I _E =0			1.5	pF
Collector Base Time Constant	Cc·rbb'	f=31.9MHz, V _{CE} =10V I _E =-5mA		10	15	ps

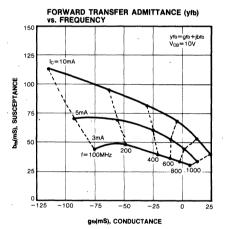
Classification	R .	0	Y
h _{FE}	60-120	90-180	120-240

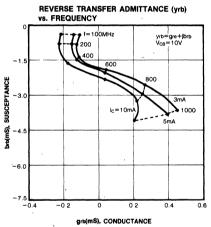


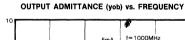


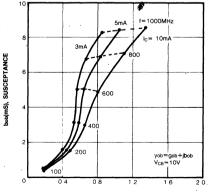












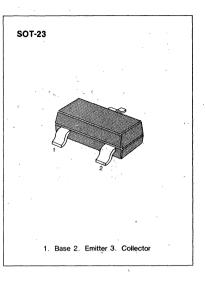
gob(mS), CONDUCTANCE

RF. MIXER FOR UHF TUNER

- HIGH POWER GAIN TYP. 17dB
- LOW NF TYP 2.8dB

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

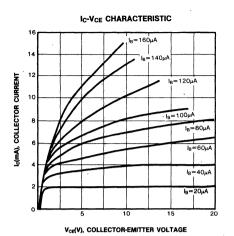
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	30 .	V
Collector-Emitter Voltage	V _{CEO}	25	V
Emitter-Base Voltage	V _{EBO}	4	V
Collector Current (DC)	l _c	20-	mΑ
Collector Dissipation	Pc	. 150	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55~150	°C

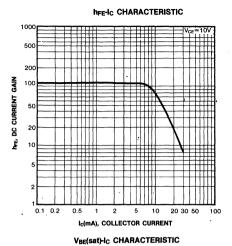


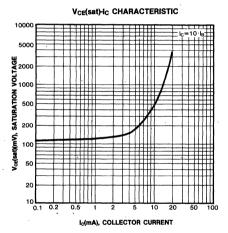
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

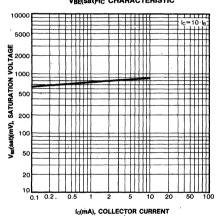
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector Cutoff Current	I _{CBO}	V _{CB} =25V, I _E =0			0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE}=10V$, $I_{C}=3mA$.60	120	240	•
Current Gain Bandwidth Product	f⊤	$V_{CE}=10V$, $I_{E}=-3mA$	750	. 1000		MHz
Output Capacitance	Cob	$f=1MHz$, $V_{CB}=10V$, $I_E=0$		0.6	0.8	pF
Noise Figure	NF	$V_{CB} = 10V, I_{E} = -3mA$ f=900MHz		2.8	4.5	dB
Power Gain	Gpb	$V_{CB}=10V$, $I_{E}=-3mA$, $f=900MHz$	14.	- 17		dB
AGC Current	I _{AGC}	Gpb AGC=I _E of G _{Pb} -30dB		-8	-11	mA

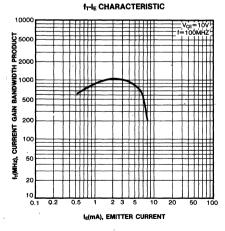


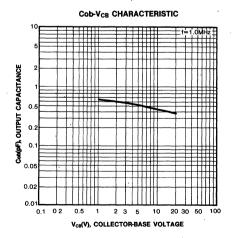


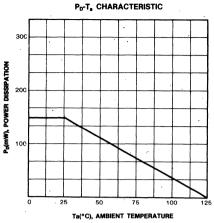


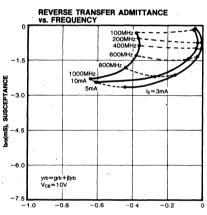


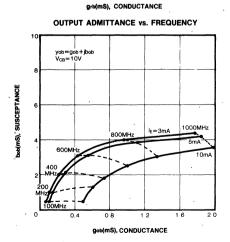


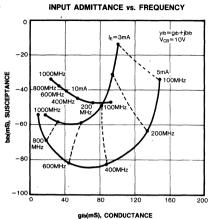


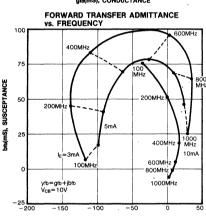


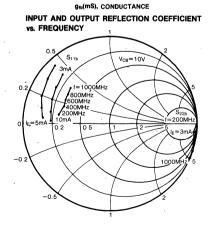




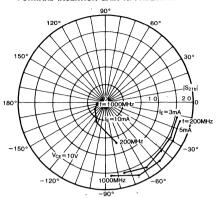


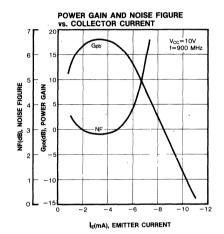




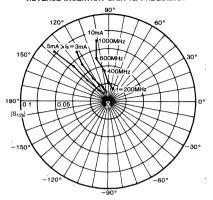


FORWARD INSERTION GAIN vs. FREQUENCY

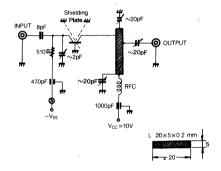




REVERSE INSERTION GAIN vs. FREQUENCY



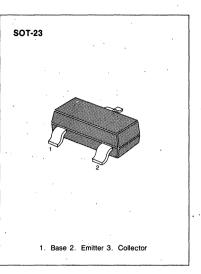
900 MHz Gpb, NF TEST CIRCUIT



MIXER, OSCILLATOR FOR UHF TUNER

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	30	V
Collector-Emitter Voltage	V _{CEO}	14	V
Emitter-Base Voltage	V _{EBO}	з 3	V
Collector Current	l _C	50	mA
Collector Dissipation	Pc	150	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55 ~ 150	°C



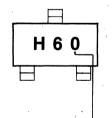
ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector Cutoff Current	I _{CBO}	V _{CB} =15V, I _E =0			0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE}=10V$, $I_{C}=5mA$	40	100	180	
Current Gain Bandwidth Product	f⊤	$V_{CE} = 10V, I_{C} = -5mA$	1.5	2		GHz
Output Capacitance	Cob	$V_{CB}=10V$, $I_E=0$, $f=1MHz$		1	1.3	pF
Conversion Gain	Gcb	$V_{CB} = 10V$, $I_E = -5mA$ $f_{RE} = 900MHz$, $fosc = 935MHz$	10	12.5		dB
`		115dBμ			,	,

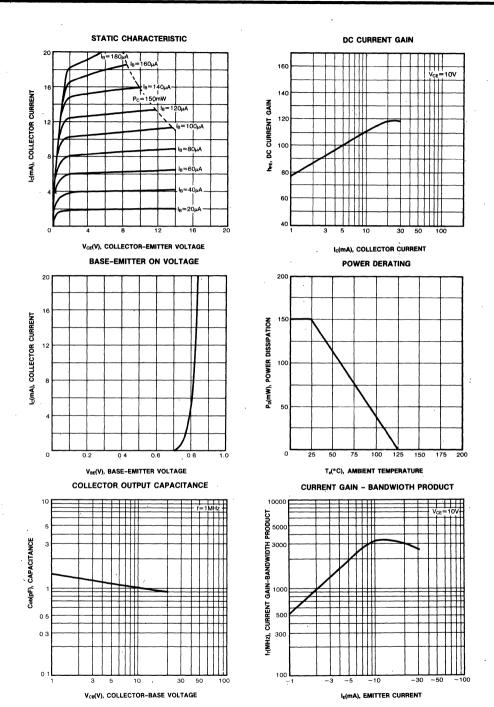
h_{FE} CLASSIFICATION

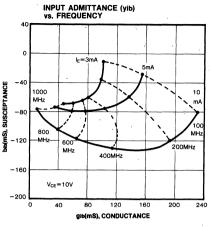
Classification	R	0	Y
h _{FE}	40-80 [°]	60-120	90-180

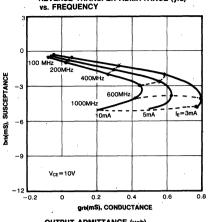
Marking



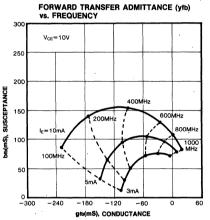
h_{FE} grade

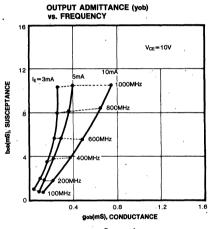


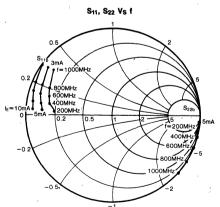


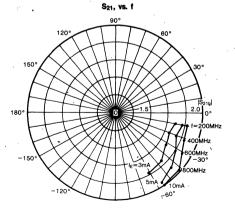


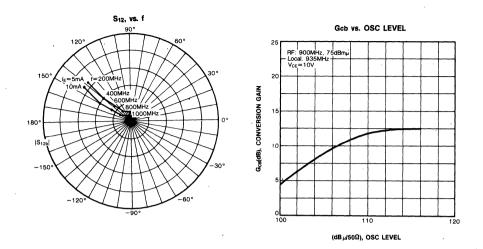
REVERSE TRANSFER ADMITTANCE (yrb)

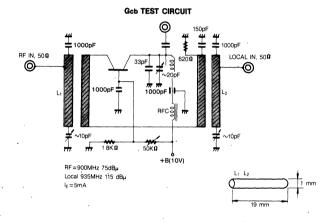










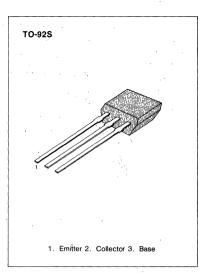


AUDIO FREQUENCY LOW NOISE AMPLIFIER

• Complement to KSA1174

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

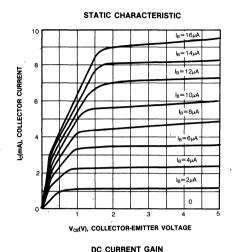
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	. V _{CBO}	120	V
Collector-Emitter Voltage	V _{CEO}	120	V
Emitter-Base Voltage	V_{EBO}	5	V
Collector Current	l _C	50	mA
Base Current	I _B	10	mA
Collector Dissipation	· Pc	300	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55∼150	°C

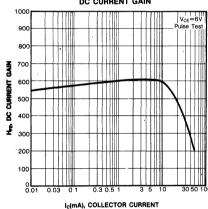


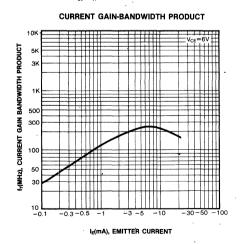
ELECTRICAL CHARACTERISTICS (Ta=25°C)

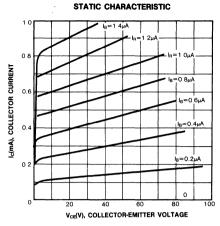
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector Cutoff Current	Ісво	V _{CB} =120V, I _E =0			50	nA
Emitter Cutoff Current	I _{EBO}	$V_{EB}=5V$, $I_{C}=0$			50	nA
DC Current Gain	h _{FÉ1}	$V_{CE} = 6V, I_{C} = 0.1 \text{ mA}$	150	580		
	h _{FE2}	V _{CE} =6V, I _C =1mA	200	600	1200	
Base Emitter On Voltage	V _{BE} (on)	$V_{CE}=6V$, $I_{C}=1mA$	0.55	0.59	0.65	V
Collector Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1mA		0.07	0.3	٧
Current Gain Bandwidth Product	f _T	$V_{CE}=6V$, $I_{E}=-1$ mA	50	110		MHz
Output Capacitance	Cob	$V_{CB} = 30V, I_{E} = 0$		1.6	2.5	pF
	-	f=1MHz				
Noise Voltage	NV			25	40	mV

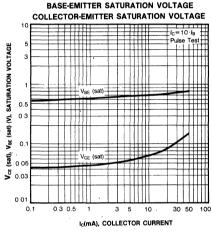
Classification	P	F	E	U
h _{FE} (2)	200-400	300-600	400-800	600-1200

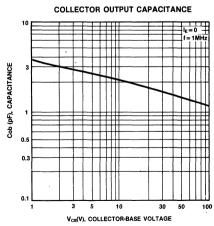










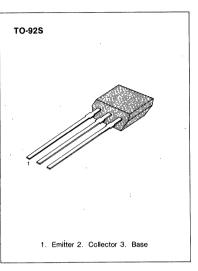


AUDIO FREQUENCY AMPLIFIER HIGH FREQUENCY OSC.

- Complement to KSA1175
- Collector-Base Voltage V_{CBO} = 60V
- High Current Gain Bandwidth Product f_T = 300MHz (Typ)

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

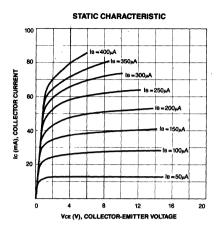
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	60	V
Collector-Emitter Voltage	V _{CEO}	50	V
Emitter-Base Voltage	V _{EBO}	5	V
Collector Current	l _C	150	mA
Collector Dissipation	Pc	250	mW
Junction Temperature	Ti	150	°C
Storage Temperature	Tstg	−55 ~ 150	•c

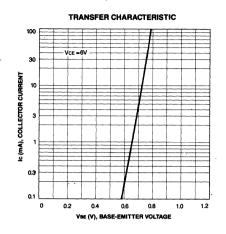


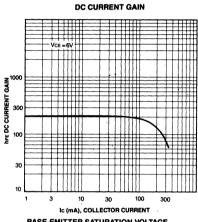
ELECTRICAL CHARACTERISTICS (Ta=25°C)

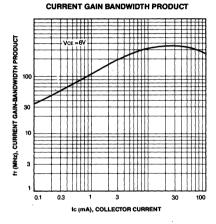
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 100 \mu A, I_{E} = 0$	60			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 10 \text{ mA}, I_{B} = 0$	50			V
Emitter-Base Breakdown Voltage	BV _{FBO}	$I_E = -10 \mu A$, $I_C = 0$	5			V
Collector Cut-off Current	I _{CBO}	V _{CB} = 40V, I _T = 0			0.1	μA
Emitter Cut-off Current	I _{EBO}	V _{EB} = 3V, I _C = 0			0.1	μA
DC Current Gain	h _{FF}	$V_{CE} = 6V, I_{C} = 1.0 \text{mA}$	70		700	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	Ic=100mA, I _B =10mA		0.15	0.3	V
Current-Gain-Bandwidth Product	f⊤	$V_{CF} = 6V$, $I_{C} = 10mA$		300		MHz
Output Capacitance	Cob	$V_{CB} = 6V, I_E = 0$ f=1MHz		2.5		ρF
Noise Figure	NF ·	$V_{CE} = 6V$, $I_E = -0.5$ mA $f = 1$ KHz, $Rs = 500$ Ω		4.0		dB

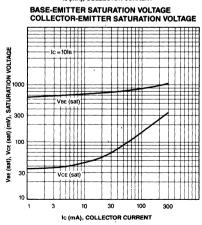
Classification	0	Y	G	, L
h _{FE}	70-140	120-240	200-400	350-700

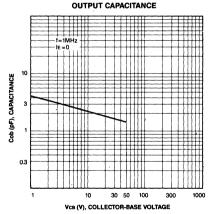










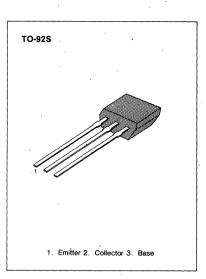


TV PIF AMPLIFIER, FM TUNER RF AMPLIFIER, MIXER, OSCILLATOR

- High Current-Gain-Bandwidth Product $f_T = 600MHz$ (Typ)
- High Power Gain Gpe=22dB at f=100MHz

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

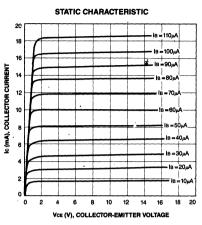
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	30	V
Collector-Emitter Voltage	V _{CEO}	20	V
Emitter-Base Voltage	V _{EBO}	4	V
Collector Current	lc	20	mA
Collector Dissipation	Pc	250	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55~150	°C

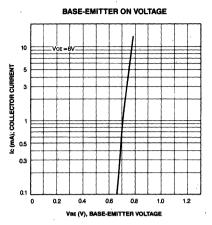


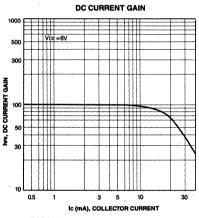
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

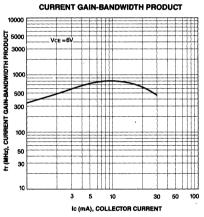
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 10 \mu \dot{A}, I_{E} = 0$	30			٧
Collector-Emitter Breakdown Voltage	BVCEO	$I_{C} = 5 \text{mA}, I_{B} = 0$	20			V
Emitter-Base Breakdown Voltage	BV_{EBO}	$I_E = -10 \mu A$, $I_C = 0$	4	}		V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 30V, I_E = 0$		}	0.1	μA
Emitter Cut-off Current	I _{EBO}	$V_{EB} = 4V, I_{C} = 0$			0.1	μA
DC Current Gain	h _{FE}	$V_{CE} = 6V$, $I_C = 1mA$	40		240	,
Base-Emitter On Voltage	V _{BE} (on)	$V_{CE} = 6V$, $I_C = 1mA$		0.72		V
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = 10 \text{mA}, I_B = 1 \text{mA}$	'	0.1	0.3	V
Current-Gain-Bandwidth Product	f⊤	$V_{CE} = 6V$, $I_{C} = 1mA$	400	600	/	MHz
Output Capacitance	Cob	$V_{CB} = 6V, I_E = 0$ f = 1MHz		1.2		pF.
Collector-Base Time Constant	Cc rbb'	$V_{CE} = 6V, I_{E} = -1mA$ f=31.9MHz		12	15	ps
Common Source Noise Figure	NF	$V_{CE} = 6V, I_{E} = -1mA$ Rs = 50 Ω , f=100MHz		3.0	5.0	dB
Power Gain	Gpe	$V_{CE}=6V$, $I_E=-1mA$ Rs = 50Ω , f=100MHz (Typ)	18	22		dB

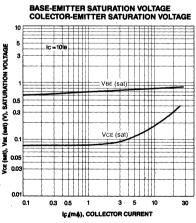
Classification	R	0	Y	
h _{FE}	40-80	70-140	120-240	

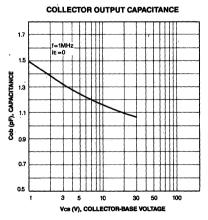


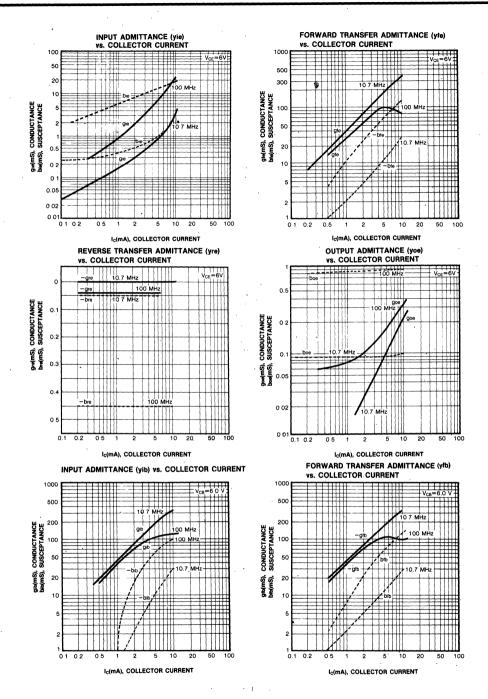


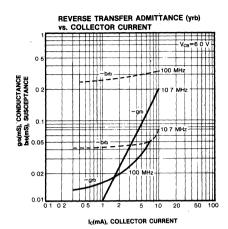


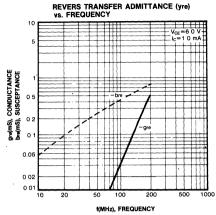


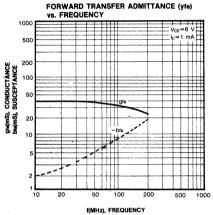


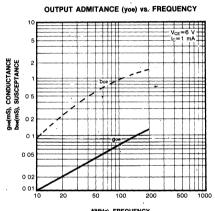


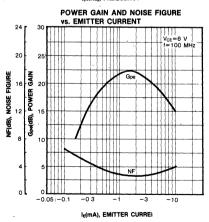


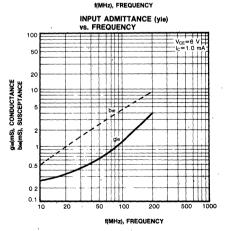


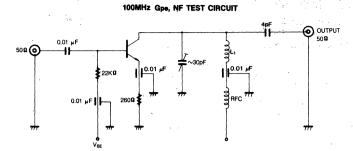










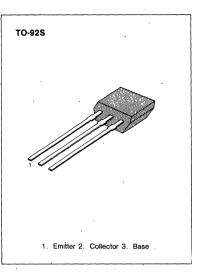


FM/AM RF AMP, MIX, CONV, OSC, IF

- Collector-Base Voltage V_{CEO} = 30V
- High Current Gain Bandwidth Product f_T = 300MHz (Typ)
- Low Collector Capacitance Cob: 2.0PF (Typ)

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

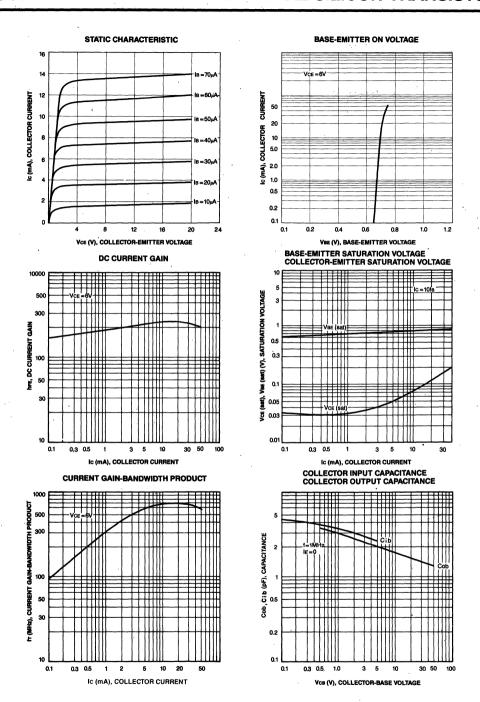
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	V
Collector-Emitter Voltage	V _{CEO}	30	V
Emitter-Base Voltage	V _{EBO}	5	V
Collector Current	Ic	50	mA
Collector Dissipation	Pc	250	mW
Junction Temperature	Ti	150	°C
Storage Temperature	Tstg	-55~150	°C



ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage Collector-Emitter Breakdown Voltage Emitter-Base Breakdown Voltage Collector Cut-off Current Emitter Cut-off Current DC Current Gain Base-Emitter On Voltage	BV _{CBO} BV _{CEO} BV _{EBO} I _{CBO} I _{EBO} h _{FE} V _{BE} (on)	$\begin{split} &I_C = 10 \mu A, \ I_E = 0 \\ &I_C = 5 m A, \ I_B = 0 \\ &I_E = -10 \mu A, \ I_C = 0 \\ &V_{CB} = 50 V, \ I_E = 0 \\ &V_{EB} = 5 V, \ I_C = 0 \\ &V_{CE} = 6 V, \ I_C = 1 m A \\ &V_{CE} = 6 V, \ I_C = 1 m A \end{split}$	50 30 5	0.67	0.1 0.1 240 0.75	V V μΑ μΑ V
Collector-Emitter Saturation Voltage Current Gain-Bandwidth Product Output Capacitance	V _{CE} (sat) f _T Cob	$I_C = 10$ mA, $I_B = 1$ mA $V_{CE} = 6$ V, $I_C = 1$ mA $V_{CB} = 6$ V, $f = 1$ MHz	150	0.08 300 2.0	0.3 2.5	MHz PF

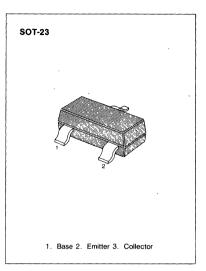
Classification	R	. 0	Y
h _{FE}	40-80	70-140	120-240



• Complement to KSA1182

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

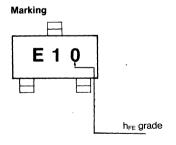
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Junction Temperature Storage Temperature	V _{CBO} V _{CEO} V _{EBO} I _C P _C Tj	35 30 5 500 150 150 -55~150	V V WA mW °C °C

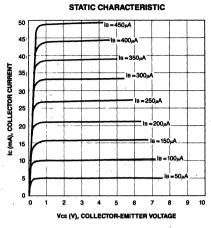


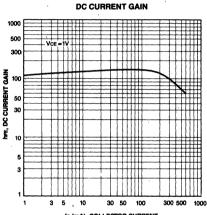
ELECTRICAL CHARACTERISTICS (Ta=25°C)

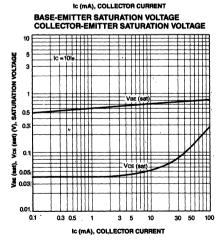
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector Cutoff Current	I _{CBO}	$V_{CB} = 35V, I_{E} = 0$			0.1	μА
Emitter Cutoff Current	I _{EBO}	V _{EB} =5V, I _C =0	1.		0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = 1V, I_{C} = 100mA$	70		240	1
	1	V _{CE} =6V, I _C =400mA	25	-	1	1
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =100mA, I _B =10mA		0.1	0.25	V
Base-Emitter On Voltage	V _{BE} (on)	I _C =100mA, V _{CE} =1V		0.8	1.0	V
Current Gain-Bandwidth Product	f _T	I _C =20mA, V _{CE} =6V		300		MHz
Output Capacitance	Cob	$V_{CB}=6V$, $I_E=0$	1	7		pF
	1	f=1MHz				

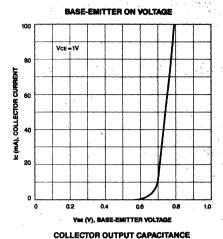
Classification	O	Υ
h _{FE}	70-140	120-240

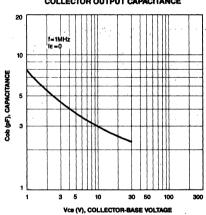










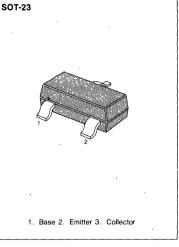


MIXER FOR UHF TV TUNER

G_{CE} = 17dB (TYP) Cre = 0.6pF (TYP)

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

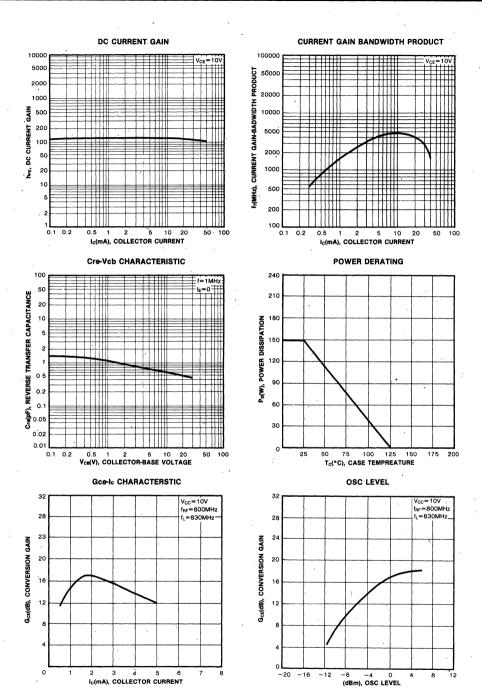
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	30	V
Collector-Emitter Voltage	V _{CEO}	15	V
Emitter-Base Voltage	V _{EBO}	3	V
Collector Current	l _c	50	mA
Base Current (DC)	l _B	25	mA
Collector Dissipation (T _c =25°C)	Pc	150	mW
Junction Temperature	Tj	125	°C
Storage Temperature	Tstg	-55~125	°C



ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C=1$ mA, $I_B=0$	15			V
Collector Cutoff Current	I _{CBO}	$V_{CB} = 30V, I_{E} = 0$			0.1	μΑ
Emitter Cutoff Current	I _{EBO}	$V_{EB}=2V$, $I_{C}=0$			1	μΑ
DC Current Gain	h _{FE}	$V_{CE}=10V$, $I_{C}=5mA$	40	100	200	
Current Gain Bandwidth Product	f⊤	$V_{CE}=10V$, $I_{C}=2mA$	1500	2400		MHz
Reverse Transier Capacitance	C_{re}	$V_{CB}=10V$, $I_E=0$, $f=1MHz$		0.6	0.9	pF
Conversion Gain	G _{ce}	V _{cc} =10V, I _c =2mA				
		f=800MHz, f _L =830MHz	12	17		dB
Noise Figure	NF	$V_{cc}=10V$, $I_c=2mA$	*			
		f=800MHz, f _L =830MHz		. 8		dB



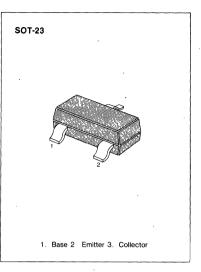


TV FINAL PICTURE AMPLIFIER APPLICATION

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	30	V
Collector-Emitter Voltage	V _{CEO}	25	V
Emitter-Base Voltage	V _{EBO}	· 4	V
Collector Current	l _c	50.	mA
Collector Dissipation	Pc	150	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55~150	°C

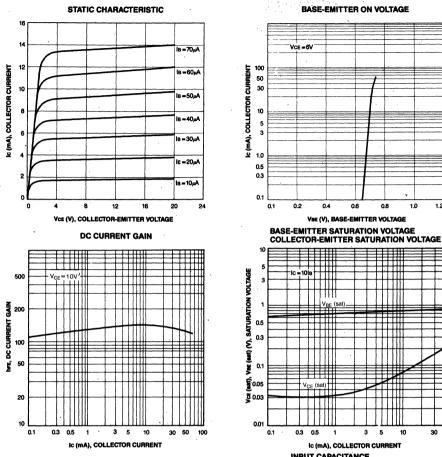
[•] Refer to KSC388 for graphs

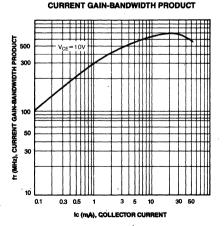


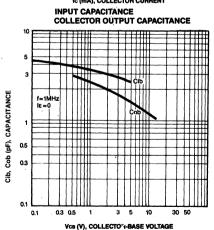
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Emitter Breakdown Voltage		$I_{C}=1 \text{ mA}. I_{B}=0$	25			v
Collector Cutoff Current	I _{CBO}	V _{CB} =3UV, I _E =0			0.1	uA
Emitter Cutoff Current	I _{EBO}	$V_{EB}=3V$, $I_{C}=0$		1	0.1	uA
DC Current Gain	h _{FE}	$V_{CE}=10V$, $I_{C}=10mA$	20	70	200	1
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =15mA, I _B =1.5mA	}		0.2	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =15mA, I _B =1.5mA	į		1.5	V
Current Gain-Bandwidth Product	f _T	I _C =10mA, V _{CE} =1(V	250	600		MHz
Output Capacitance	Cob	$V_{CB} = 10V, I_E = 0$	1	1.1	1.6	pF
•		f=1MHz				
			1	i		1









1.0

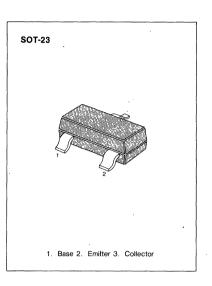
LOW FREQUENCY AMPLIFIER

• Complement to KSA1298

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	30	V
Collector-Emitter Voltage	V _{CEO}	25	v .
Emitter-Base Voltage	V _{EBO}	5	v
Collector Current	l _C	800	mA.
Base Current	. l _B	160	mA
Collector Dissipation	Pc	200	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55~150	°C

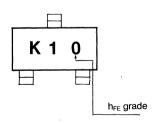
[·] Refer to KSD261 for graphs



ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =10mA, I _B =0	25			٧
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E=1$ mA, $I_C=0$	5 .			V
Collector Cutoff Current	I _{CBO}	V _{CB} =30V, I _E =0			100	nA
Emitter Cutoff Current	I _{EBO}	$V_{EB} = 5V, I_{C} = 0$			100	nA
DC Current Gain	h _{FE1}	$V_{CE} = 1 V, I_{C} = 100 mA$	100		320	
	h _{FE2}	V _{CE} =1V, I _C =800mA	40			
Collector Emitter Saturation Voltage	V _{CE} (sat)	I _C =500mA, I _B =20mA			0.4	V
Base-Emitter On Voltage	V _{BE} (on)	V _{CE} =1V, I _C =10mA	0.5		0.8	ν.
Current Gain Bandwidth Product	f _T	$V_{CE}=5V$, $I_{C}=10mA$,		120		MHz
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1MHz		13		pF

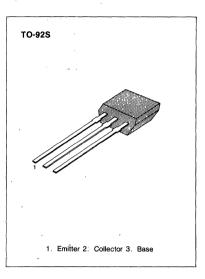
Classification	0	Y
h _{FE} (1)	100-200	160-320



- Complement to KSA1378
- Collector Dissipation Pc = 300mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

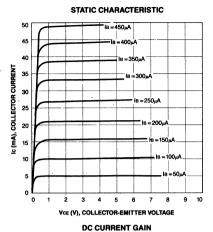
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	. 30	٧
Collector-Emitter Voltage	V _{CEO}	25	V
Emitter-Base Voltage	V _{EBO}	5	V
Collector Current	Ic	300	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Ti	150	°C
Storage Temperature	Tstg	-55~150 ·	°C

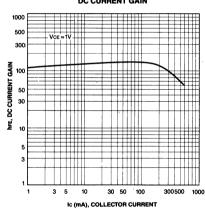


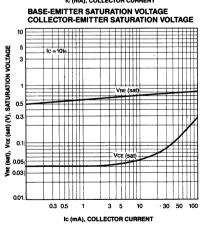
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

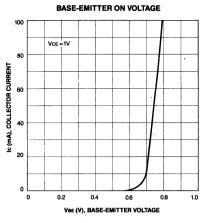
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{\rm C} = 100 \mu A, I_{\rm E} = 0$	30			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 10 \text{mA}, I_{B} = 0$	25			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_{\rm F} = -10 \mu A$, $I_{\rm C} = 0$	5			V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 25V, I_E = 0$		1	0.1	μΑ
Emitter Cut-off Current	I _{EBO}	$V_{EB} = 3V, I_{C} = 0$		1	0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = 1V, I_{C} = 50mA$	70		400	,
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 30.9 \text{mA}, I_{B} = 30 \text{mA}$		0.14	0.4	V

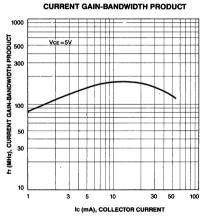
Classification	0	Y	G
h _{FE}	70-140	120-240	200-400

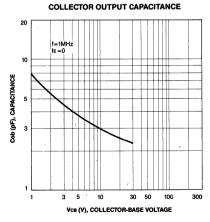








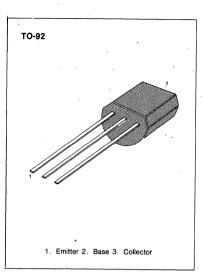




- Complement to KSA642
- Collector Dissipation Pc=400mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

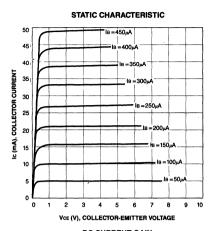
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	30	V
Collector-Emitter Voltage	V _{CEO}	2 5 ′	V
Emitter-Base Voltage	V _{EBO}	5	V
Collector Current	l _C	300	mA
Collector Dissipation	Pc	400 ⁻	mW
Junction Temperature	Ti	150	°C
Storage Temperature	Tstg	-55 ~ 150	°C

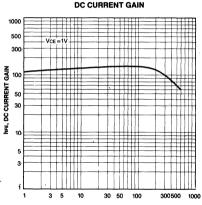


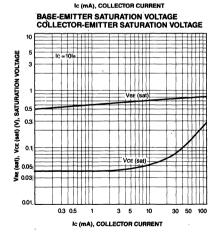
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

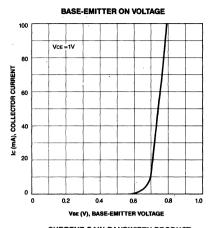
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =100μA, I _E =0	30			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 10 \text{mA}, I_{B} = 0$	25			V.
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_{\rm E} = -10 \mu A$, $I_{\rm C} = 0$	5			V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 25V, I_{E} = 0$			0.1	μΑ
Emitter Cut-off Current	I _{EBO}	$V_{EB} = 3V, I_{C} = 0$			0.1	μA
DC Current Gain	h _{FE}	$V_{CE} = 1V, I_{C} = 50 \text{mA}$	70		400	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =300mA, I _B =30mA		0.14	0.4	V

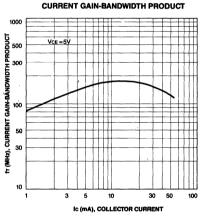
Classification	0	Y	G
h _{FE}	70-140	120-240	200-400

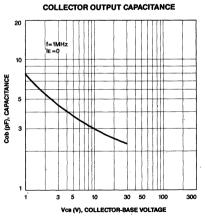








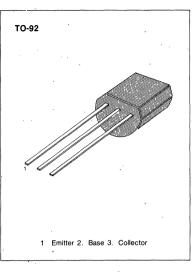




- Complement to KSA643
- Collector Dissipation Pc=500mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

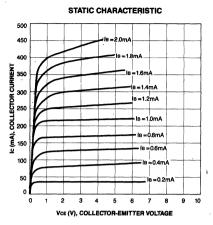
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	40	V
Collector-Emitter Voltage	V _{CEO}	20	V
Emitter-Base Voltage	V _{EBO}	. 5	V
Collector Current	Ic	500	mA
Collector Dissipation	Pc	500	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55 ~ 150	°C

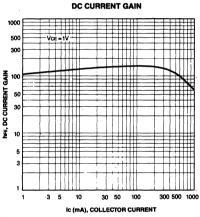


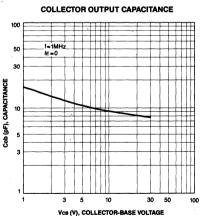
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

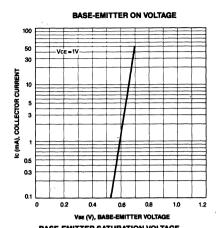
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Ünit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 100 \mu A, I_{E} = 0$	40			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 10 \text{mA}, I_{B} = 0$	20			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = -100 \mu A$, $I_C = 0$	5.			V
Collector Cut-off Current	ICBO	V _{CB} = 25V, I _E = 0	1		0.1	μΑ
Emitter Cut-off Current	I _{EBO}	$V_{EB} = 3V, I_{C} = 0$			0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = 1V, I_{C} = 0.1A$	40		400	1
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = 0.5A$, $I_B = 0.05A$		0.18	0.4	V

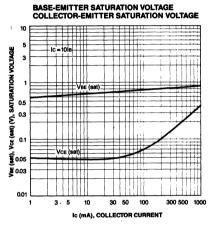
Classification	R	0	Y	G
h _{FE}	40-80	70-140	120-240	200-400









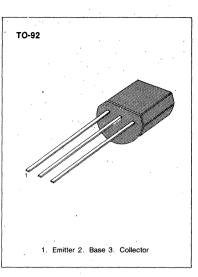


AUDIO FREQUENCY POWER AMPLIFIER

- Complement to KSB564A
- Collector Current Ic=1A
- Collector Dissipation Pc=800mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	40	v
Collector-Emitter Voltage	V _{CEO}	30	V
Emitter-Base Voltage	V _{EBO}	5	† v
Collector Current	lc	1	Α
Collector Dissipation	Pc	800	mW
Junction Temperature	Tj.	150	•c
Storage Temperature	Tsta	-55~150	•C

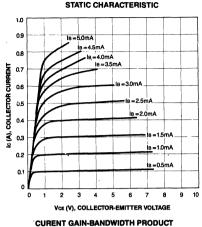


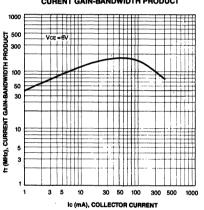
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

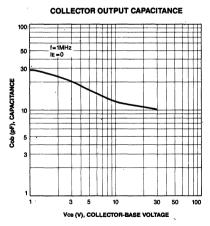
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 100 \mu A, I_{E} = 0$	40			v
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 10 \text{mA}, I_{B} = 0$	30			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 100 \mu A, I_C = 0$.5			V
Collector Cut-off Current	I _{CBO}	V _{CB} = 30V, I _E = 0			0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} = 1V, I _C = 100mA	70		400	'
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 1A, I_{B} = 0.1A$			0.5	l v
Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_{C} = 1A$, $I_{B} = 0.1A$			1.2	V
Current Gain-Band width Product	fr	V _{CE} =6V, I _C =10mA		130		MHz
Output Capacitance	Cob	V _{CB} =6V, I _E =0, f=1MHz		16		pF
	1			Į.		1

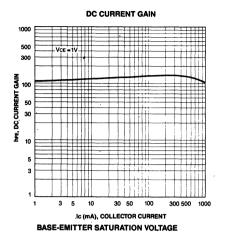
hFE CLASSIFICATION

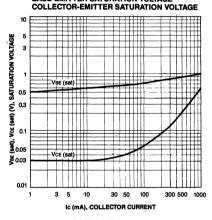
Classification	0	Y	G
h _{FE}	70-140	120-240	200-400

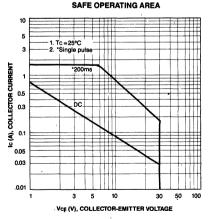












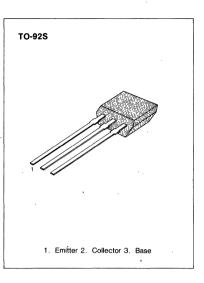
AUDIO FREQUENCY AMPLIFIER

• Complement to KSB810

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CBO}	30	V
Collector-Emitter Voltage	V _{CEO}	25	· v
Emitter-Base Voltage	V _{EBO}	5.0	V
Collector Current (DC)	l _c	700	mA
*Collector Current (Pulse)	lc	1.0	Α
Collector Dissipation	Pc	350	mW
Junction Temperature	T _i	150	°C
Storage Temperature	Tstg	+55∼150	°C
I .	I I	l .	1

^{*} PW \leq 10 ms, duty cycle \leq 50 %



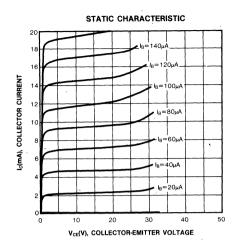
ELECTRICAL CHARACTERISTICS (Ta=25°C)

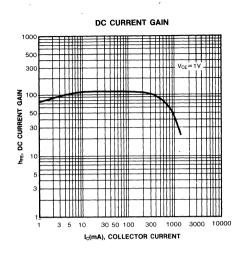
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector Cutoff Current	I _{CBO}	V _{CB} =30V, I _E =0			100	nA
Emitter Cutoff Current	I _{EBO}	$V_{EB}=5V$, $I_{C}=0$			100	nA
*DC Durrent Gain	h _{FE} 1	$V_{CE}=1V$, $I_{C}=100mA$	70	200	400	
	h _{FE} 2	$V_{CE} = 1V, I_{C} = 700 \text{mA}$	35	140		
*Base Emitter Voltage	V _{BE}	V _{CE} =6V, I _C =10mA	600	640	700	mV
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =700mA, I _B =70mA		0.20	0.4	V
*Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =700mA, I _B =70mA		0.95	1.2	V
Output Capacitance	Сов	$V_{CB}=6V$, $I_E=0$, $f=1MHz$		13	25	pF
Current Gain-Bandwidth Product	f _T	$V_{CE}=6V$, $I_{E}=-10mA$	50	170		MHz
•						

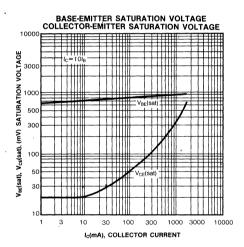
^{*} Pulse Test: PW≤350 μs, Duty Cycle ≤ 2% Pulsed

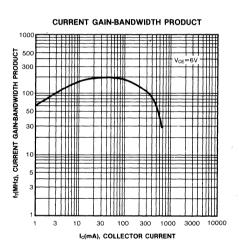
h_{FE}(1) CLASSIFICATION

Classific	Classification O		Υ	G
h _{FE} (1	1) 7	0-140 1:	20-240 20	00-400







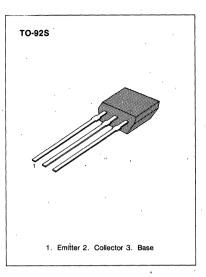


AUDIO FREQUENCY POWER AMPLIFIER

- Complement to KSB811
- Collector Current Ic=1A
- Collector Dissipation Pc = 350mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	40	V
Collector-Emitter Voltage	V _{CEO}	30	V
Emitter-Base Voltage	V _{EBO}	5	V
Collector Current	Ic	1	Α
Collector Dissipation	Pc	350	mW
Junction Temperature	Ti	150	•C
Storage Temperature	Tstg	−55 ~ 150	°C

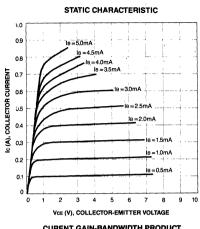


ELECTRICAL CHARACTERISTICS (Ta = 25°C)

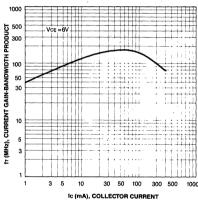
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 100 \mu A, I_{E} = 0$	40			v
Collector-Emitter Breakdown Voltage	BV _{CEO}	$l_{c}=10mA, l_{B}=0$	30			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = -100 \mu A$, $I_C = 0$	5			V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 30V, I_{E} = 0$			0.1	μA
DC Current Gain	h _{FE}	$V_{CE} = 1V$, $I_{C} = 100 \text{mA}$	70		400	1
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 1A$, $I_{B} = 0.1A$			0.5	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_{C} = 1A$, $I_{B} = 0.1A$			1.2	V
Current Gain-Band width Product	fr	V _{CF} =6V, I _C =10mA		130		MHz
Output Capacitance	Cob	V _{CB} =6V, I _E =0, f=1MHz		16		pF

hFE CLASSIFICATION

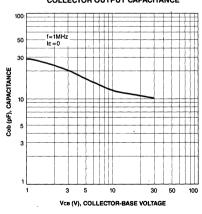
Classification	0	Υ	G
· h _{FE}	70-140	120-240	200-400



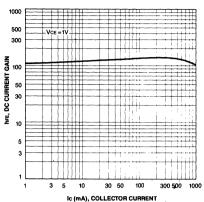




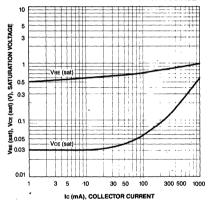
COLLECTOR OUTPUT CAPACITANCE



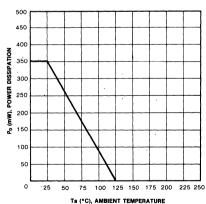
DC CURRENT GAIN



BASE-EMITTER SATURATION VOLTAGE COLLECTOR-EMITTER SATURATION VOLTAGE



POWER DERATING



AUDIO FREQUENCY POWER AMPLIFIER MEDIUM SPEED SWITCHING

. Complement to KSB1116/1116A

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage : KSD1616 : KSD1616A	V _{CBO}	60 120	\ \ \
Collector-Emitter Voltage : KSD1616 : KSD1616A	V _{CEO}	50 60	V V
Emitter-Base Voltage	V _{EBO}	6	V
Collector Current (DC) * Collector Current (Pulse)	lc lc	1 2	A
Collector Dissipation Junction Temperature	P _C Tj	0.75 150	°C
Storage Temperature	Tstg	-55∼150	°C

TO-92 1. Emitter 2. Collector 3. Base

ELECTRICAL CHARACTERISTICS (Ta=25°C)

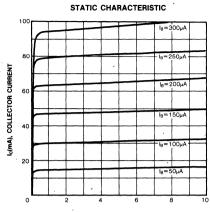
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector Cutoff Current	Ісво	V _{CB} =60V, I _E =0			100	nA
Emitter Cutoff Current	I _{EBO}	$V_{EB} = 6V, I_{C} = 0$			100	nA
*DC Current Gain : KSD1616	h _{FE1}	$V_{CE}=2V, I_{C}=100mA$	135		600	
: KSD1616A			135		400	
	h _{FE2}	$V_{CE}=2V$, $I_{C}=1A$	81			
*Base Emitter On Voltage	V _{BE} (on)	V _{CE} =2V, I _C =50mA	600	640	700	mV
*Collector Emitter Saturation Voltage	V _{CE} (sat)	I _C =1A, I _B =50mA	,	0.15	0.3	V
*Base Emitter Saturation Voltage	V _{BE} (sat)	I _C =1A, I _B =50mA		0.9	1.2	V
Output Capacitance	Cob	$V_{CB} = 10V, I_{E} = 0, f = 1MHz$		19		pF
Current Gain Bandwidth Product	f⊤	V _{CE} =2V, I _C =100mA	100	160		MHz
Turn On Time	ton	V _{cc} =10V, I _c =100mA	Í	0.07		μS
Storage Time	ts	$I_B 1 = -I_B 2 = 10 \text{mA}$		0.95		μS
Fall Time	tf	V_{BE} (off)=-2 \sim -3V		0.07		μs

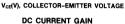
^{*} Pulse Test: PW≲350µs, Duty Cycle≤2% Pulsed

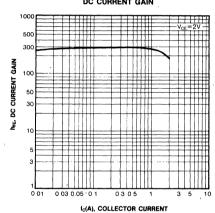
h_{FE}(1) CLASSIFICATION

Classification	fication Y G		L	
h _{FE} (1)	135-270	200-400	300-600	

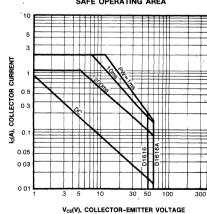
^{*} PW≤10ms, Duty Cycle≤50%



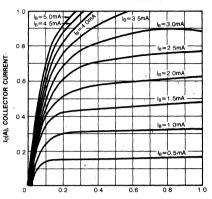




SAFE OPERATING AREA

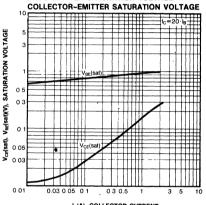




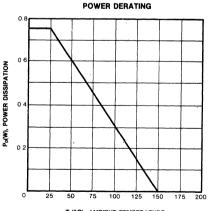


V_{CE}(V), COLLECTOR-EMITTER VOLTAGE



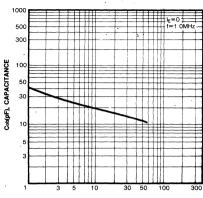


Ic(A), COLLECTOR CURRENT



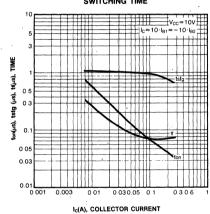
Ta(°C), AMBIENT TEMPERATURE



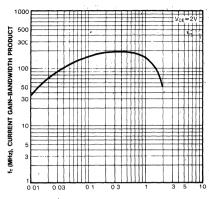


V_{CB}(V), COLLECTOR-BASE VOLTAGE

SWITCHING TIME



CURRENT GAIN-BANDWIDTH PRODUCT



8

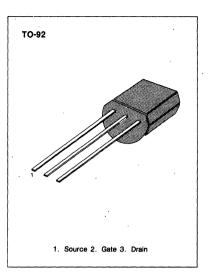
LOW NOISE PRE-AMP. USE

High Input Impedance: Igss = 1nA (MAX)

Low Noise: NF=0.5dB (TYP) High Voltage: V_{gds}=-50V

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Gate-Drain Voltage	V _{gds}	-50	٧
Gate Current	l _g	10	mA
Collector Dissipation	Pc	100	mW
Junction Temperature	Ti	125	°C
Storage Temperature	Tstg	-55~125	°C

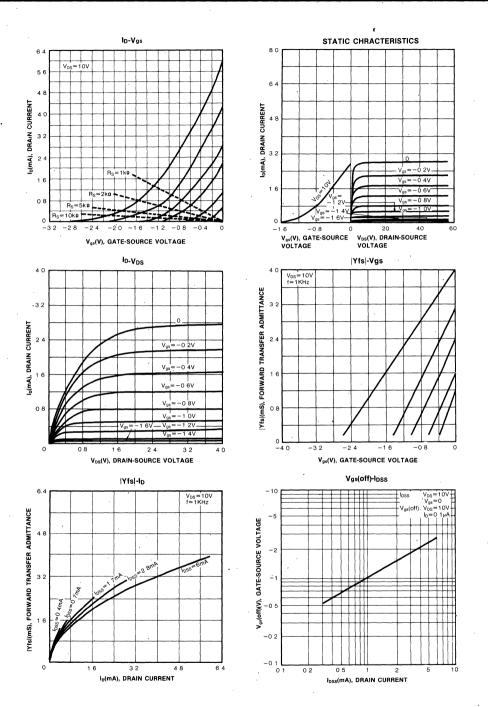


ELECTRICAL CHARACTERISTICS (Ta=25°C)

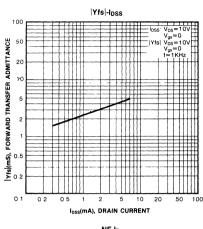
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Gate-Drain Breakdown Voltage	BV _{ads}	$V_{DS} = 0, I_0 = -100 \mu A$	-50			V
Gate Leak Current	I _{gss}	$V_{as} = -30V, V_{DS} = 0$			-1	nA
Drain Leak Current	Ipss	$V_{DS} = 10V, V_{GS} = 0$	0.3		6.5	mA
Gate-Source Voltage	V _{as} (off)	$V_{DS} = 10V, I_D = 0.1 \mu A$	-0.4		-5	v
Forward Transfer Admittance	Y _{fs}	V _{DS} =10V, V _{QS} =0, f=1KHz	1.2			mS
Input Capacitance	Ciss	$V_{DS}=0$, $V_{gs}=0$, $f=1$ MHz		8.2	1	pF
Feedback Capacitance	Crss	$V_{gd} = -10V, V_{DS} = 0$				ļ
		f=1MHz		2.6		pF
Noise Figure	NF	V _{DS} =15V, V _{gs} =0				
		$R_g = 100 k\Omega$		0.5	5	dB
		f=120Hz				

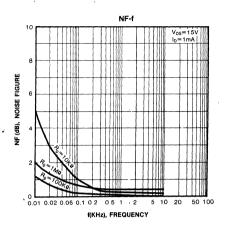
I_{DSS} CLASSIFICATION

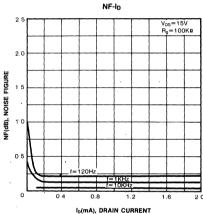
Classification	R	0,	· Y	G
I _{DSS} (mA)	0.30-0.75	0.60-1.40	1.20-3.00	2.60-6.50

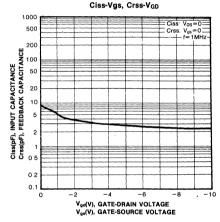


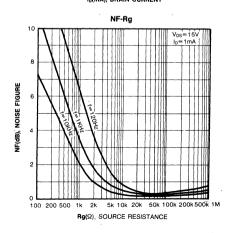


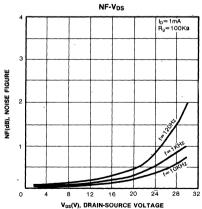


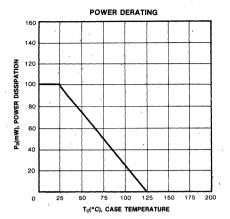










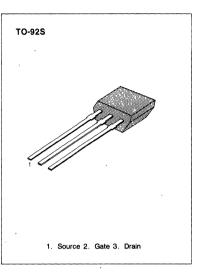


AF IMPEDANCE CONVERTER

- . Built-In Diode Between G and S
- Low NV

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Drain-Source Voltage	V _{DSO}	12	V
Gate-Drain Voltage	V _{GDO} ●	12	V
Drain-source Current	Ipso	2	mA
Drain-Gate Current	Ipgo	2	mA
Gate-Source Current	I _{GSO}	2	mA
Power Dissipation	Pp	20	mW
Operate Temperature	T _{OPR}	-10~+70	°C
Storage Temperature	Tstg	-20~+80	°C

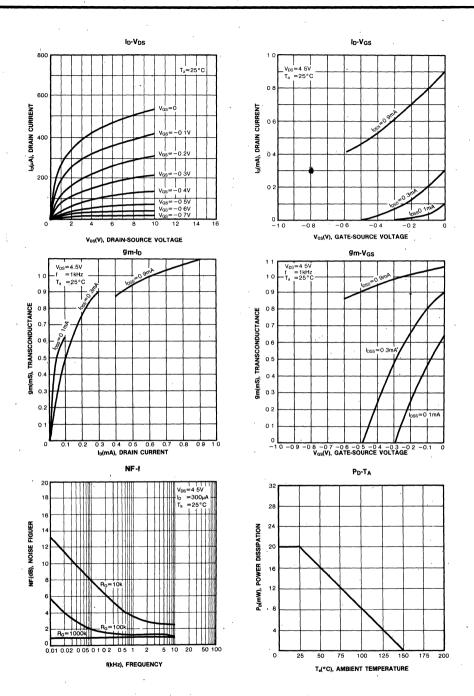


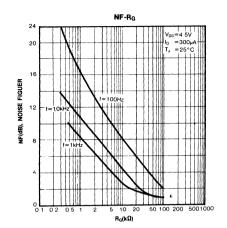
ELECTRICAL CHARACTERISTICS (Ta=25°C)

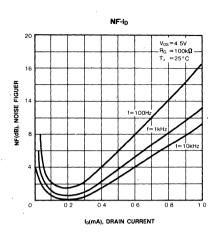
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Drain Current	I _{DSS}	V_{DS} =4.5V, V_{GS} =0, R_{S} =2.2k Ω ±1%	0.04		0.8	mA
Transconductance	9m	V_{DS} =4.5V, V_{GS} =0, P_{S} =2.2k Ω ±1%, f=1kHz	300	500		μS
Noise Voltage	NV	V_{DS} =4.5V, R_S =2.2k Ω ±1%, C_G =10pF. A curve			4.	μV
Voltage Gain	G _{v1}	V_{DS} =4.5V, R_{S} =2.2k Ω ±1%, C_{G} =10pF, E_{G} =100mV, f =70Hz	•	-10		dB
Voltage Gain	G _{v2}	V_{DS} =12V, R_{S} =2.2k Ω ±1%, C_{G} =10pF, E_{G} =100mV, f =70Hz		-9.5		dB
Voltage Gain	G _{v3}	$V_{DS}=1V, R_{S}=2.2k\Omega 1\%, C_{G}=10pF, E_{G}=100mV, f=70Hz$		-11		dB

IDSS-GV CLASSIFICATION

Classification	Ρ	Q
I _{DSS} (mA)	0.04-0.2	0.15-0.8
G _{v1} (dB)	>-13	>-12
G _{v2} (dB)	>-12	>-11
$\Delta IG_{v1}-G_{v2}I(dB)$	<3	<3
△ I G _{v1} -G _{v3} I(dB)	<3	







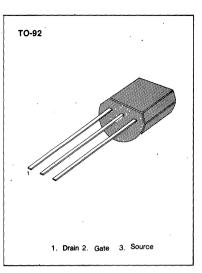
LOW FREQUENCY LOW NOISE AMP.

High |Yfs|: 15mS (TYP)

High Input Impedance : $I_{gss} = -1nA$ Low Noise, NF = 1dB (TYP)

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Gate-Drain Voltage	V_{gds}	-50	V
Gate Current	l _g	10	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj	125	°C
Storage Temperature	Tstg	-55~125	°C

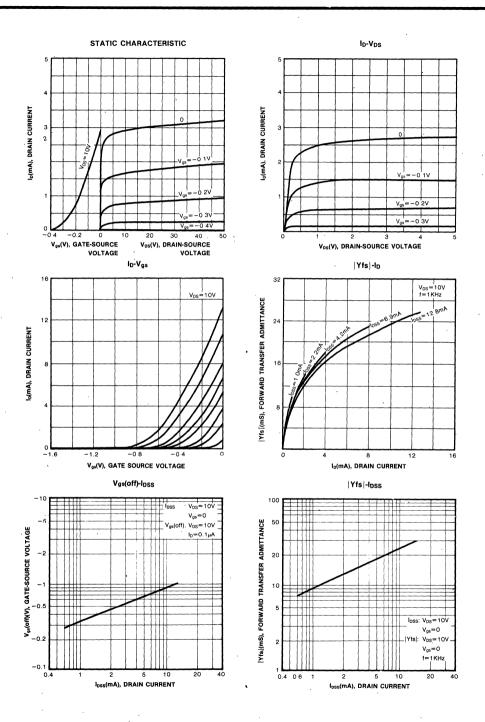


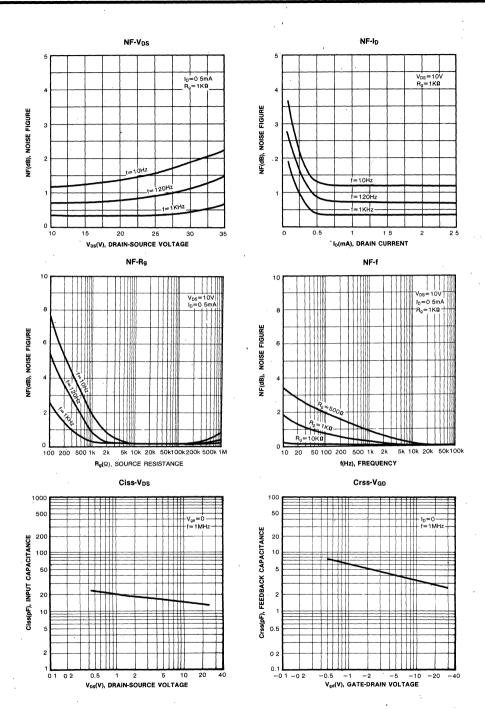
ELECTRICAL CHARACTERISTICS (Ta=25°C)

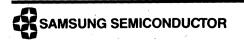
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Gate-Drain Breakdown Voltage	BV _{gds}	$V_{DS} = 0$, $I_0 = -100 \mu A$	-50			. V
Gate Leak Current	lass	$V_{qs} = -30V, V_{DS} = 0$			-1	nΑ
Drain Leak Current	I _{DSS}	$V_{DS} = 10V, V_{GS} = 0$	0.6		14	mA
Gate-Source Voltage	V _{qs} (off)	$V_{DS} = 10V, I_D = 0.1 \mu A$	-0.2		-1.5	· V
Forward Transfer Admittance	Y _{fs}	$V_{DS} = 10V, V_{qs} = 0, f = 1KHz$	4.0	15		mS
Input Capacitance	Ciss	$V_{DS} = 10V, V_{gs} = 0, f = 1 MHz$		13		pF
Feedback Capacitance	Crss	$V_{gd} = 10V, I_D = 0$				
		f=1MHz		3		pF
Noise Figure .	NF1	$V_{DS}=10V, R_{q}=1k\Omega$				
	1	$I_D=0.5mA$, $f=10Hz$		5	10	dB
	NF2	$V_{DS}=10V, R_{q}=1k\Omega$				
•		$I_D=0.5$ mA, $f=1$ KHz		1	2	dB

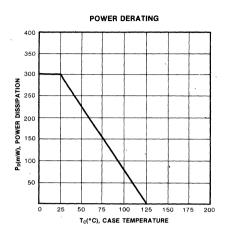
IDSS CLASSIFICATION

Classification	Y	G -	, L
I _{DSS} (mA)	1.2-3.0	2.6-6.5	6.0-14







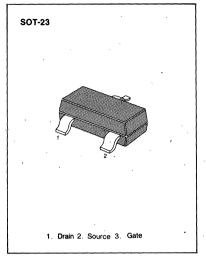


AF IMPEDANCE CONVERTER

- BUILT-IN DIODE BETWEEN G AND S
- . LOW NV

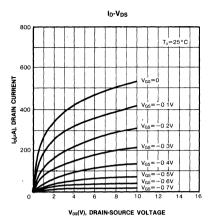
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

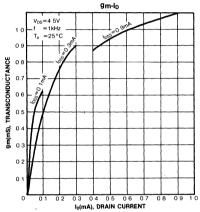
Characteristic	Symbol	Rating	Unit
Drain Source Voltage	V _{DSO}	20	V
Drain Gate Voltage	V _{DGO}	20	V
Drain Source Current	I _{DSO}	2	mA
Drain Gate Current	lpgo	2	mA
Gate Source Current	I _{GSO}	2	mA
Power Dissipation	PD	200	mW
Operate Temperature	TOPR	-20~80	°C
Storage Temperature	T _{STG}	-55~100	°C

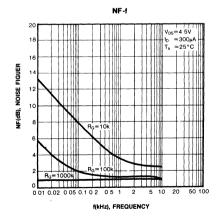


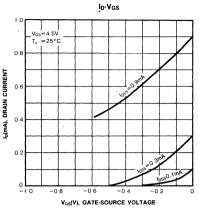
ELECTRICAL CHARACTERISTICS (Ta=25°C)

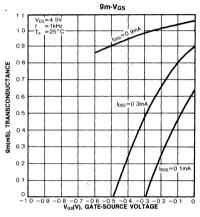
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Drain Current	I _{DSS}	V_{DS} =4.5V, V_{GS} =0 R _S =2.2kohm ± 1%	130	200	470	μΑ
Transconductance	gm	V_{DS} =4.5V, V_{GS} =0 R_S =2.2kohm±1%, f=1kHz C_G =10pF, A curve	0.9	1.6	4	mS μV
Voltage Gain	G _∨ 1	V_{DS} =4.5V, R_{S} =2.2kohm ± 1% C_{G} =10pF, E_{G} =10mV, f=70Hz	-1			dB
Voltage Gain	G _V 2	$V_{DS}=12V$, $R_{S}=2.2kohm\pm1\%$ $C_{G}=10pF$, $E_{G}=10mV$, $f=70Hz$				dB
Voltage Gain	G _v 3	V_{DS} =1.5V, R_{S} =2.2kohm±1% C_{G} =10pF, E_{G} =10mV, f=70Hz	-4			dB ,

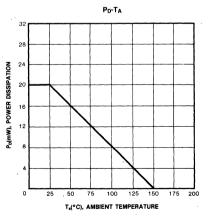


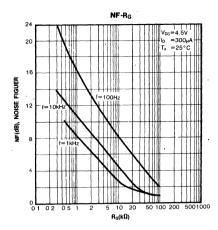


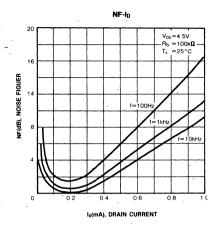










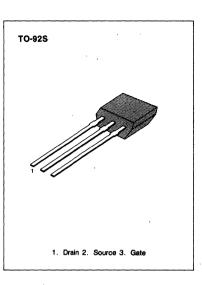


FM TUNER VHF AMPLIFIER

- NF = 2.5 dB (TYP)
- $\bullet |Y_{FS}| = 9.0 \text{ mS (TYP)}$

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Gate-Drain Voltage	V_{GDO}	-18	V
Gate Current	l _G	10	mA
Power Dissipation	P _D	200	mW
Junction Temperature	Τ,	150	°C
Storage Temperature	Tstg	−55 ∼150	°C

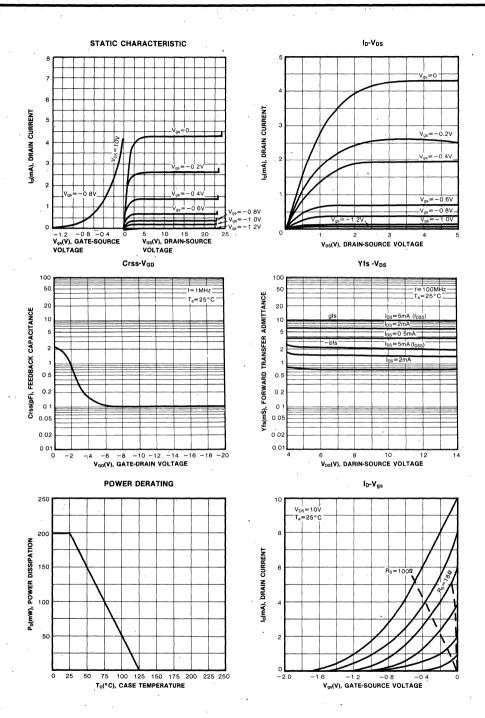


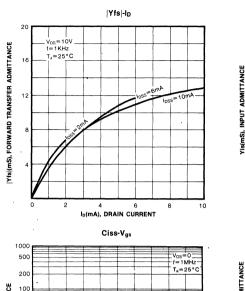
ELECTRICAL CHARACTERISTICS (Ta=25°C)

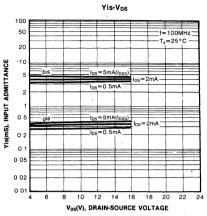
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Gate Cut-off Current	I _{GSS}	$V_{GS} = -0.5V, V_{DS} = 0$			-10	nA
Gate-Drain Breakdown Voltage	V(BR) _{GDO}	$I_G = -100\mu A$, Drain	-18			V
Drain Current	Ipss	$V_{DS} = 10V, V_{GS} = 0$	1.0	1	10	mA
Gate-Source Cuf-off Voltage	V _{GS} (off)	$V_{DS} = 10V, I_D = 1 \mu A$	0.4		4.0	V
Forward Transfer Admittance	Y _{FS}	V _{DS} =10V, V _{GS} =0, f=1kHz		9		mS
Reverse Transfer Capacitance	Crss	V _{GD} =10V, f=1MHz		i i	0.15	pF
Power Gain	C _{PS}	V _{DD} =10V, f=100MHz	}	18		dB
Noise Figuer	NF	V _{DD} =10V, f=100MHz		2.5	3.5	dB

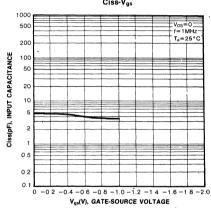
IDSS CLASSIFICATION

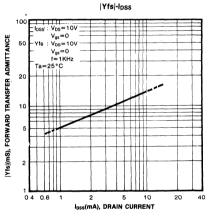
Classification	0	Y	G
loss	1.0-3.0	2.5-6.0	5.0-10

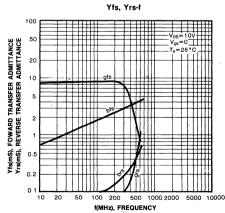


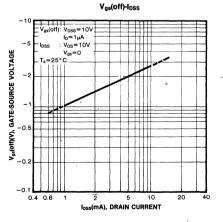


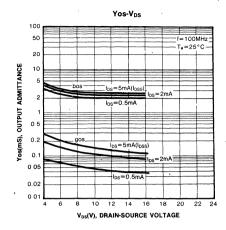


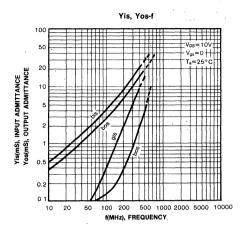










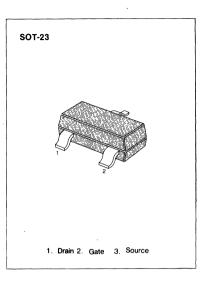


FM TUNER VHF AMPLIFIER

- NF = 2.5 dB (TYP)
- $\bullet |Y_{FS}| = 9.0 \text{ mS (TYP)}$

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Gate-Drain Voltage	V _{GDO}	-18	· v
Gate Current	l _G	10	mA
Power Dissipation	PD	200	mW
Junction Temperature	T,	150	°C
Storage Temperature	Tstg	−55 ∼150	°C

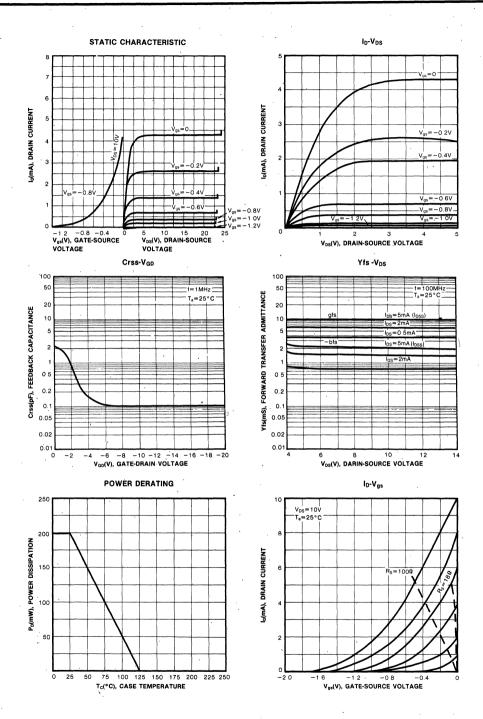


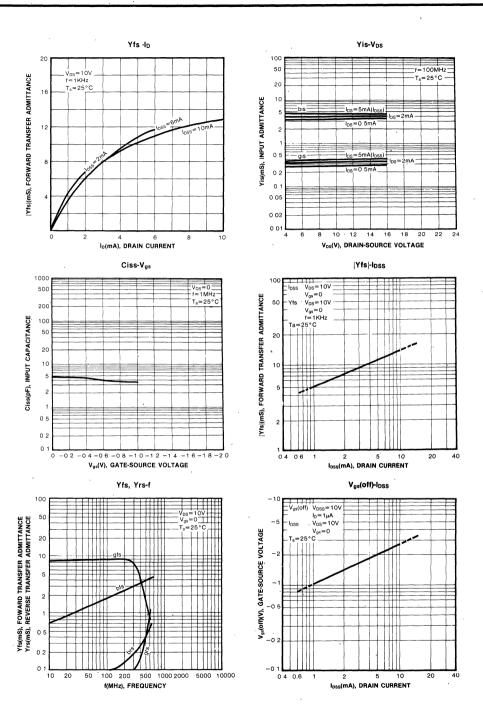
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

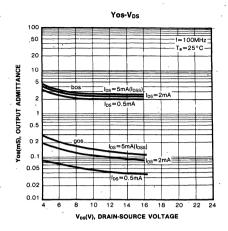
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Gate Cut-off Current	I _{GSS}	$V_{GS} = -0.5V, V_{DS} = 0$			-10	nA
Gate-Drain Breakdown Voltage	V(BR) _{GDO}	$I_G = -100\mu A$, Drain	-18			v
Drain Current	Ipss	$V_{DS} = 10V, V_{GS} = 0$	1.0		10	mA
Gate-Source Cuf-off Voltage	V _{GS} (off)	$V_{DS} = 10V, I_D = 1 \mu A$	0.4		4.0	V
Forward Transfer Admittance	Y _{FS}	V _{DS} =10V, V _{GS} =0, f=1kHz		9		mS
Reverse Transfer Capacitance	Crss	V _{GD} =10V, f=1MHz		,	0.15	pF
Power Gain	C _{PS}	V _{DD} =10V, f=100MHz		18		dB
Noise Figuer	NF	V _{DD} =10V, f=100MHz		2.5	3.5	dB

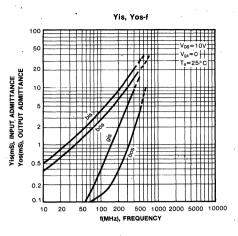
IDSS CLASSIFICATION

Classification	0	Y	G ·
l _{oss}	1.0-3.0	2.5-6.0	5.0-10







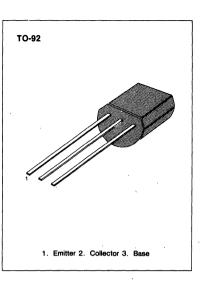


SWITCHING APPLICATION (Bias Resistor Built In)

- Switching circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor ($R_1 = 4.7K\Omega$, $R_2 = 4.7K\Omega$)
- Complement to KSR2001

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

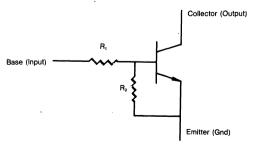
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	V
Collector-Emitter Voltage	V _{CEO}	50	V
Emitter-Base Voltage	V _{EBO}	10	V
Collector Current	lc	100	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj .	150	°C
Storage Temperature	Tstg	−55∼150	°C

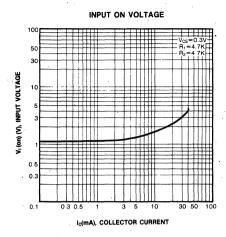


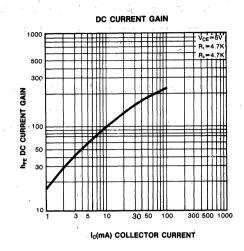
ELECTRICAL CHARACTERISTICS (Ta=25°C)

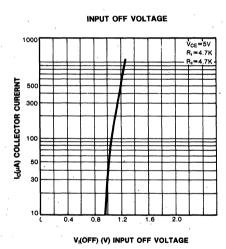
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 10 \mu\text{A}$ $I_{E} = 0$	50			v
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C}=100\mu A, I_{B}=0$	50			V
Collector Cutoff Current	I _{CBO}	V _{CB} =40V, I _E =0			0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =10mA	20		1	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =0.5mA	1		0.3	V
Current Gain-Bandwidth Product	f _T	V _{CE} =5mA, I _C =10V		250		MHz
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1.0MHz		3.7		pF
Input Off Voltage	Vi(off)	V _{CE} =5V, I _C =100μA	0.5			V
Input On Voltage	Vi(on)	V _{CE} =0.3V, I _C =20mA	1		3	V
Input Resistor	R ₁	, ,	3.2	4.7	6.2	KΩ
Resistor Ratio	R ₁ /R ₂		0.9	1	1.1	

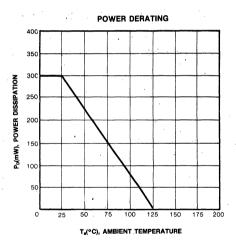
Equivalent Circuit









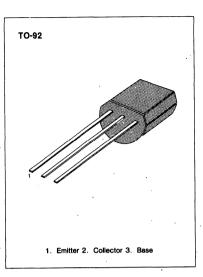


SWITCHING APPLICATION (Bias Resistor Built In)

- Switching circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor ($R_1=10K\Omega$, $R_2=10K\Omega$)
- Complement to KSR2002

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

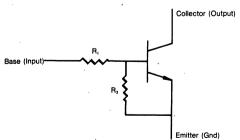
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	V
Collector-Emitter Voltage	V _{CÉO}	50	' V
Emitter-Base Voltage	V _{EBO}	10	V
Collector Current	I _C	100	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55~150	°C

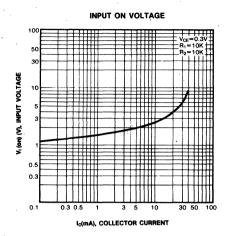


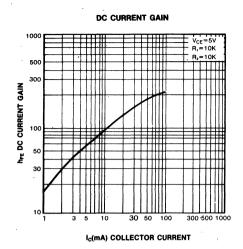
ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =10μA, I _E =0	50			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =100µA, I _B =0	50		}	V
Collector Cutoff Current	Ісво	V _{CB} =40V, I _E =0			0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =5mA	30			} '
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =0.5mA			0.3	V
Current Gain-Bandwidth Product	f _T	V _{CE} =5mA, I _C =10V		250		MHz
Output Capacitance	·Cob	V _{CB} =10V, I _E =0 f=1.0MHz		3.7		pF
Input Off Voltage	Vi(off)	V _{CE} =5V, I _C =100μA	0.5		'	V
Input On Voltage	Vi(on)	V _{CE} =0.3V, I _C =10mA			3	V
Input Resistor	R₁		7	10	13	ΚΩ
Resistor Ratio	R ₁ /R ₂	,	0.9	1	1.1	

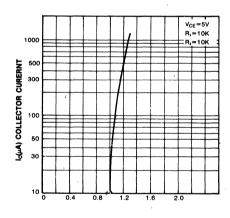
Equivalent Circuit



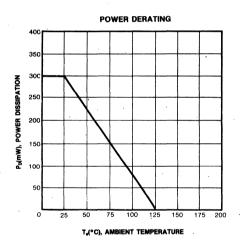










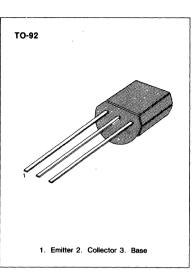


SWITCHING APPLICATION (Bias Resistor Built In)

- Switching circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor (R₁=22K Ω , R₂=22K Ω)
- Complement to KSR2003

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

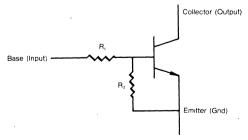
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	٧
Collector-Emitter Voltage	V _{CEO}	50	V
Emitter-Base Voltage	V _{EBO}	10	V
Collector Current	l _C	100	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj	150	°C
Storage. Temperature	Tstg	−55 ~ 150	°C

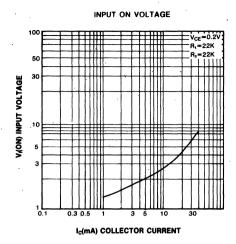


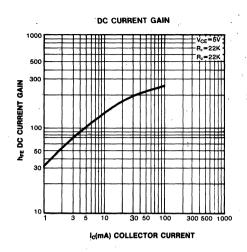
ELECTRICAL CHARACTERISTICS (Ta=25°C)

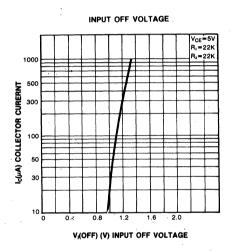
Characteristic	Symbol	Test Condition	Min	Тур	Max	. Unit
Collector-Base Breakdown Voltage	BV _{c80}	I _C =10μA, I _E =0	50			v
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C}=100\mu A, I_{B}=0$	50			V
Collector Cutoff Current	Ісво	V _{CB} =40V, I _E =0			0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =5mA	56		1	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =0.5mA		,	0.3	V
Current Gain-Bandwidth Product	f _T	V _{CE} =5mA, I _C =10V	ł	250	1	MHz
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1.0MHz		3.7		pF
Input Off Voltage	Vi(off)	V _{CE} =5V, I _C =100μA	0.5			V
Input On Voltage	Vi(on)	V _{CE} =0.2V, I _C =5mA	ļ.		3.0	V
Input Resistor	R ₁		15	22	29	KΩ
Resistor Ratio	R_1/R_2		0.9	1	1.1	1

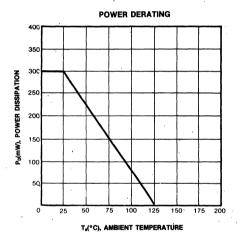
Equivalent Circuit







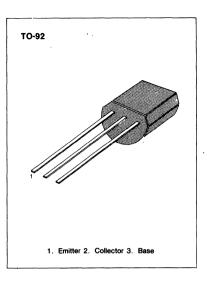




- Switching circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor($R_1 = 47K\Omega$, $R_2 = 47K\Omega$)
- Complement to KSR2004

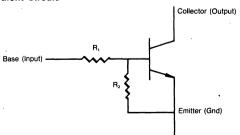
ABSOLUTE MAXIMUM RATINGS $(T_a = 25$ °C)

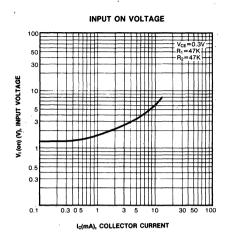
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	V
Collector-Emitter Voltage	V _{CEO}	50	V
Emitter-Base Voltage	V _{EBO}	10	V
Collector Current	lc	100	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55~150	°C

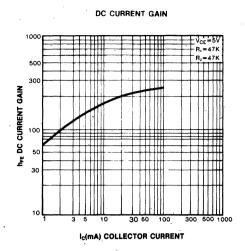


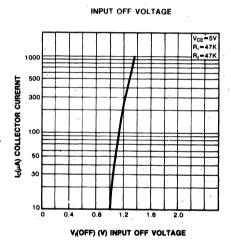
ELECTRICAL CHARACTERISTICS (Ta=25°C)

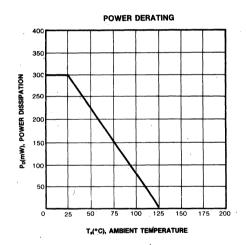
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =10μΑ, I _E =0	50			V.
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C}=100\mu A, I_{B}=0$	50			v
Collector Cutoff Current	I _{CBO}	V _{CB} =40V, I _E =0	1		0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =5mA	68			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =0.5mA			0.3	V
Current Gain-Bandwidth Product	f _T	V _{CE} =5mA, I _C =10V	1	250		MHz
Output Capacitance	Cob	V _{CB} =10V, I _E =0		3.7		pF
• `		f=1.0MHz	1			
Input Off Voltage	Vi(off)	V _{CE} =5V, I _C =100μA	0.5			V
Input On Voltage	Vi(on)	V _{CE} =0.3V, I _C =5mA	ĺ		3	\ \ \
Input Resistor	R ₁		32	47	62	KΩ
Resistor Ratio	R ₁ /R ₂		0.9	1	1.1	







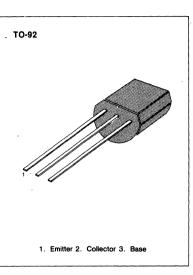




- Switching Circuit, Inverter, Interface circuit
 Driver circuit
- Built in bias Resistor (R, =4.7K Ω , R, =10K Ω)
- Complement to KSR2005

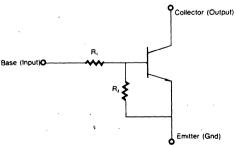
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

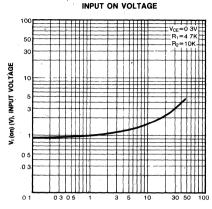
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	v
Collector-Emitter Voltage	V _{CEO}	50	V
Emitter-Base Voltage	V _{EBO}	10	V
Collector Current	l _c	100	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	~55 ~ 150	°C



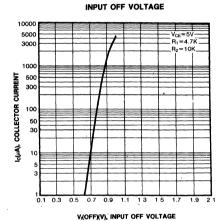
ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =10μA, I _E =0	50			v
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 100 \mu A, I_{B} = 0$	50			V
Collector Cutoff Current	I _{CBO}	V _{CB} =40V, I _E =0			0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =5mA	30			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C}=10mA, I_{B}=0.5mA$			0.3	V
Output Capacitance	Cob	$V_{CB}=10V$, $I_{E}=0$ f=1MHz		3.7		pF
Current Gain-Bandwidth Product	f⊤	V _{CE} =10V, I _C =5mA		250		MHz
Input Off Voltage	Vi(off)	V _{CE} =5V, I _C =100μA	0.3			V
Input On Voltage	Vi(on)	V _{CE} =0.3V, I _C =20mA			2.5	V
Input Resistor	R ₁		32	4.7	6.2	ΚΩ
Resistor Ratio	R ₁ /R ₂		0.42	0.47	0.52	

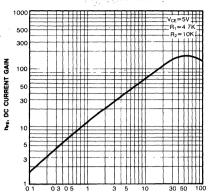




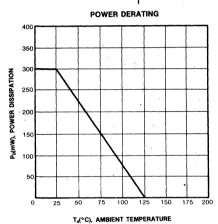




DC CURRENT GAIN



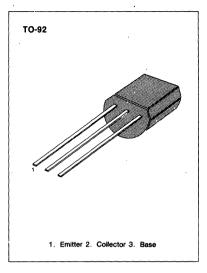
Ic(mA), COLLECTOR CURRENT



- Switching Circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor (R₁=10KΩ, R₂=47KΩ)
- Complement to KSR2006

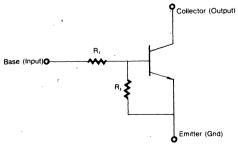
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	V
Collector-Emitter Voltage	V _{CEO}	50	V
Emitter-Base Voltage	V _{EBO}	10	V
Collector Current	Ic	100	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55∼150	°C,

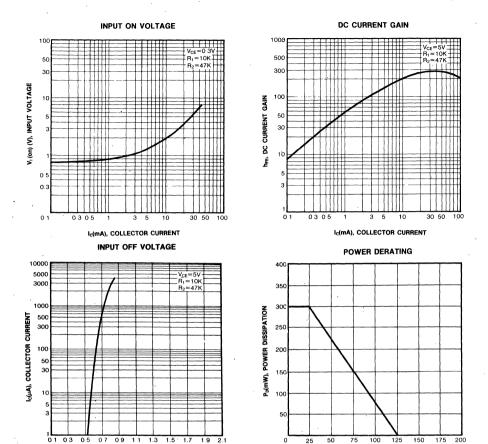


ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =10μA, I _E =0	50			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 100 \mu A, I_{B} = 0$	50			V
Collector Cutoff Current	I _{CBO}	$V_{CB} = 40.V, I_E = 0$	٠.		0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =5mA	68			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =0.5mA			0.3	V
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1MHz		3.7		pF
Current Gain-Bandwidth Product	f _T	V _{CE} =10V, I _C =5mA		250		MHz
Input Off Voltage	Vi(off)	V _{CE} =5V, I _C =100μA	0.3			V
Input On Voltage	Vi(on)	V _{CE} =0.3V, I _C =1mA			1.4	V
Input Resistor	R ₁		7	10	13	KΩ
Resistor Ratio	R ₁ /R ₂		0.19	0.21	0.24	



Ta(°C), AMBIENT TEMPERATURE

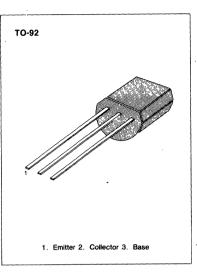


V(OFF)(V), INPUT OFF VOLTAGE

- Switching Circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor (R₁=22KΩ, R₂=47KΩ)
- Complement to KSR2007

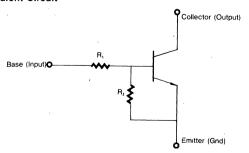
ABSOLUTE MAXIMUM RATINGS $(T_a=25$ °C)

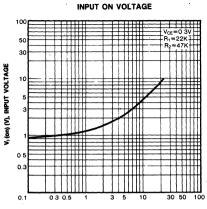
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Junction Temperature Storage Temperature	V _{CBO} V _{CEO} V _{EBO} I _C P _C Tj	50 50 10 100 300 150 -55~150	V V MA mW °C



ELECTRICAL CHARACTERISTICS (Ta = 25°C)

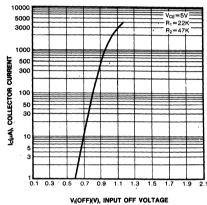
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =10μA, I _E =0	50			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C}=100\mu A, I_{B}=0$	50			V
Collector Cutoff Current	I _{CBO}	V _{CB} =40V, I _E =0			0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =5mA	68			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =0.5mA			0.3	٧
Output Capacitance	Cob	$V_{CB}=10V$, $I_{E}=0$ f=1MHz		3.7		pF
Current Gain-Bandwidth Product	f _T	V _{CE} =5mA, I _C =10V		250		MHz
Input Off Voltage	Vi(off)	V _{CE} =5V, I _C =100μA	0.4			V
Input On Voltage	Vi(on)	V _{CE} =0.3V, I _C =2mA			2.5	٧
Input Resistor	R ₁		15	22	29	KΩ
Resistor Ratio	R ₁ /R ₂	,	0.42	0.47	0.52	







INPUT OFF VOLTAGE

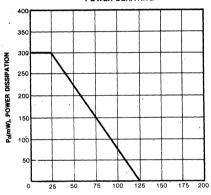


DC CURRENT GAIN

Ic(mA), COLLECTOR CURRENT

POWER DERATING

0.3 0.5

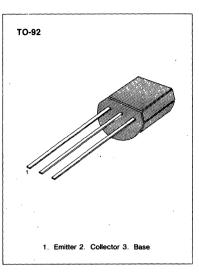


Ta(°C), AMBIENT TEMPERATURE

- Switching circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor ($R_1 = 47K\Omega$, $R_2 = 22K\Omega$)
- Complement to KSR2008

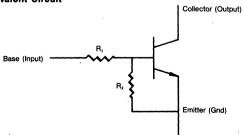
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

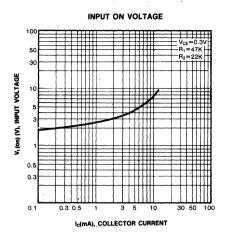
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	V
Collector-Emitter Voltage	V _{CEO}	50	V
Emitter-Base Voltage	V_{EBO}	10	V
Collector Current	lc	100	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55∼150	°C



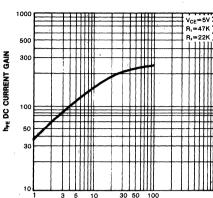
ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C}=10\mu A, I_{E}=0$	50			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C}=100\mu A, I_{B}=0$	50	1		V
Collector Cutoff Current	I _{CBO}	V _{CB} =40V, I _E =0	}		0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =5mA	56			· ·
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =0.5mA	}		0.3	V
Current Gain-Bandwidth Product	f _T	V _{CE} =5mA, I _C =10V	1	250		MHz
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1.0MHz		3.7		pF
Input Off Voltage	Vi(off)	V _{CE} =5V, I _C =100μA	0.8			V
Input On Voltage	Vi(on)	V _{CE} =0.3V, I _C =2mA	l		4	V
Input Resistor	R ₁		32	47	62	ΚΩ
Resistor Ratio	R ₁ /R ₂		1.9	2.1	2.4	
	l	{	1	1	1	1



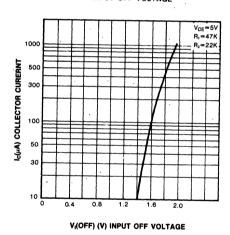


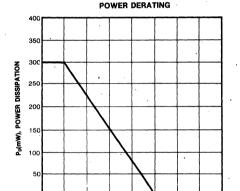




Ic(mA) COLLECTOR CURRENT

INPUT OFF VOLTAGE



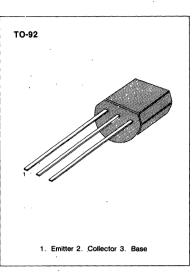


T_s(°C), AMBIENT TEMPERATURE

- Switching Circuit, Inverter, Interface circuit
 Driver circuit
- Built in bias Resistor (R=4.7KΩ)
- Complement to KSR2009

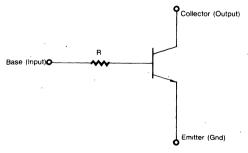
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

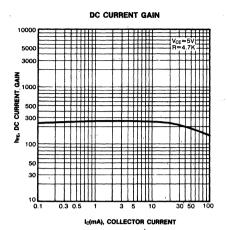
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	40	٧
Collector-Emitter Voltage	V _{CEO}	40	V
Emitter-Base Voltage	V _{EBO}	5	V
Collector Current	l _C	100	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Ti	150	°C
Storage Temperature	Tstg	-55~150	°C

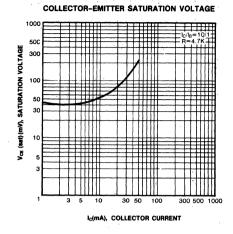


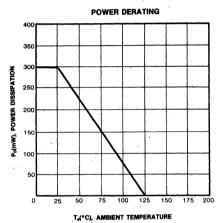
ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =100μA, I _E =0	40			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =1mA, I _B =0	40			V
Collector Cutoff Current	I _{CBO}	V _{CB} =30V, I _E =0			0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =1mA	100		600	}
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1mA	1		0.3	V
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1MHz		3.70		pF
Current Gain-Bandwidth Product	f⊤	V _{CE} =10V, I _C =5mA	j	250		MHz
Input Resistor	R		3.2	4.7	6.2	KΩ





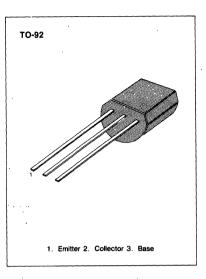




- Switching Circuit, Inverter, Interface circuit
 Driver circuit
- Built in bias Resistor (R=10K Ω)
- Complement to KSR2010

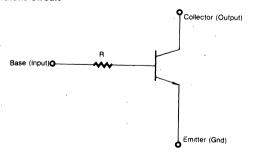
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

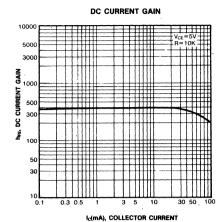
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation	V _{CBO} V _{CEO} V _{EBO} I _C P _C	40 40 5 100 300	V V V mA mW
Junction Temperature Storage Temperature	Tj Tstg	150 -55 _, ~150	°C °C

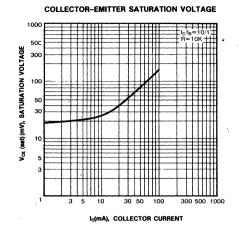


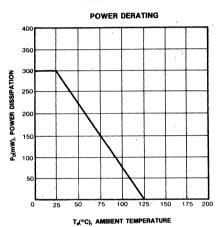
ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =100μA, I _E =0	40			٧
Emitter-Emitter Breakdown Voltage	BV _{CEO}	I _E =1mA, I _B =0	40			٧
Collector Cutoff Current	Ісво	V _{CB} =30V, I _E =0			0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =1mA	100		600	•
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1mA		,	0.3	V
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1MHz		3.7		pF
Current Gain-Bandwidth Product	f _T	V _{CE} =10V, I _C =5mA		250		MHz
Input Resistor	R		7	10	13	KΩ





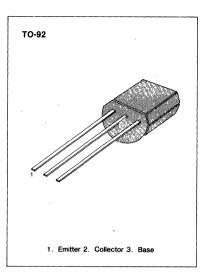




- Switching Circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor (R=22KΩ)
- Complement to KSR2011

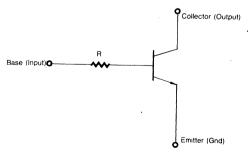
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Junction Temperature Storage Temperature	V _{CBO} V _{CEO} V _{EBO} I _C P _C Tj Tstg	40 40 5 100 300 150 -55~150	V V W MA mW °C °C



ELECTRICAL CHARACTERISTICS (Ta=25°C)

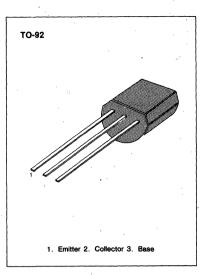
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =100μA, I _E =0	40			ν
Emitter-Emitter Breakdown Voltage	BV _{CEO}	$I_E=1 \text{ mA}, I_B=0$	40		}	V
Collector Cutoff Current	Icao	V _{CB} =30V, I _E =0	1		0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =1mA	100		600	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1mA			0.3	V
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1MHz		3.7		pF
Current Gain-Bandwidth Product Input Resistor	f _T R	V _{CE} =10V, I _C =5mA	15	250 22	29	MHz KΩ



- Switching Circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor (R=47KΩ)
- Complement to KSR2012

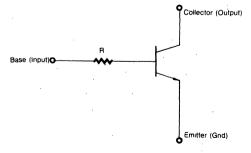
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage	V _{CBO}	40 40	V V
Emitter-Base Voltage	V _{EBO}	5	v
Collector Current	l _c	100	mA .
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55~150	°C



ELECTRICAL CHARACTERISTICS (Ta=25°C,

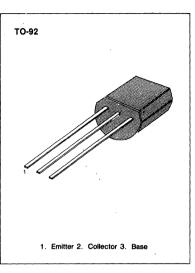
Characteristic	Symbol	Test Condition	Min	Тур	`Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =100μA, I _E =0	40			٧
Emitter-Emitter Breakdown Voltage	BVCEO	$I_E=1 \text{ mA}, I_B=0$	40			V
Collector Cutoff Current	Ісво	V _{CB} =30V, I _E =0	1		0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =1mA	100		600	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1mA			0.3	٧
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1MHz		3.7		pF
Current Gain-Bandwidth Product	fr	V _{CE} =10V, I _C =5mA		250		MHz
Input Resistor	R		32	47	62	KΩ



- Switching circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor ($R_1 = 2.2K\Omega$, $R_2 = 47K\Omega$)
- Complement to KSR2013

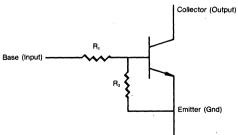
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	٧
Collector-Emitter Voltage	V _{CEO}	50	v
Emitter-Base Voltage	V _{EBO}	10	V
Collector Current	lc	100	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55 ~ 150	°C



ELECTRICAL CHARACTERISTICS (Ta=25°C)

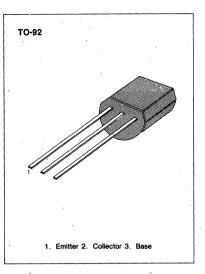
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CEO}	I _C =10μA, I _E =0	50			٧
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C}=100\mu A, I_{B}=0$	50			٧
Collector Cutoff Current	I _{CBO}	V _{CB} =40V, I _E =0			0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =5mA	68			•
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =0.5mA			0.3	٧
Current Gain-Bandwidth Product	f _T	V _{CE} =5mA, I _C =10V		250		MHz
Output Capacitance	Cob	V _{CB} =10V, I _E =0		3.7		pF
		f=1.0MHz				
Input Off Voltage	Vi(off)	V _{CE} =5V, I _C =100μA	0.5			ĺ V
Input On Voltage	Vi(on)	V _{CE} =0.2V, I _C =5mA		•	1.1	٧
Input Resistor	R ₁		1.5	2.2	2.9	KΩ
Resistor Ratio	R ₁ /R ₂		0.042	0.047	0.052	



- Switching circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor($R_1 = 4.7 K\Omega$, $R_2 = 47 K\Omega$)
- Complement to KSR2014

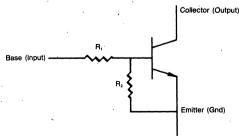
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	٧
Collector-Emitter Voltage	V _{CEO}	50	V
Emitter-Base Voltage	V _{EBO}	10.	V
Collector Current	lc	100	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj	150	°C \
Storage Temperature	Tstg	-55~150	· °C



ELECTRICAL CHARACTERISTICS (Ta=25°C)

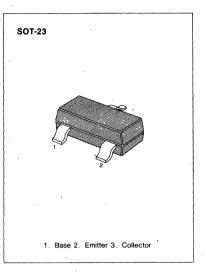
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CEO}	I _C =10μΑ, I _E =0	50			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 100 \mu A, I_{B} = 0$	50			V
Collector Cutoff Current	I _{CBO}	V _{CB} =40V, I _E =0			0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =5mA	68			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =0.5mA			0.3	V
Current Gain-Bandwidth Product	f _T	V _{CE} =5mA, I _C =10V		250		MHz
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1.0MHz	,	3.7		pF
Input Off Voltage	Vi(off)	$V_{CE} = 5V$, $I_{C} = 100 \mu A$	0.5			V
Input On Voltage	Vi(on)	V _{CE} =0.2V, I _C =5mA			1.3	V
Input Resistor	R ₁		3.2	4.7	6.2	ΚΩ
Resistor Ratio	R ₁ /R ₂		0.09	0.1	0.11	



- Switching Circuit, Inverter, Interface circuit
 Driver circuit
- Built in bias Resistor (R₁=4.7K Ω R₂=4.7K Ω)
- Complement to KSR2101

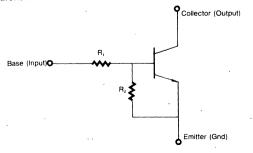
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

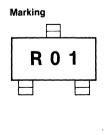
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Junction Temperature Storage Temperature	V _{CBO} V _{CEO} V _{EBO} I _C P _C Tj Tstq	50 50 10 100 200 150 -55~150	V V V mA mW °C



ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C}=10 \mu A, I_{E}=0$	50			v
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 100 \mu A, I_{B} = 0$	50			V
Collector Cutoff Current	I _{CBO}	V _{CB} =40V, I _E =0		,	0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =5V, J _C =10mA	20			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =0.5mA			0.3	٧
Current Gain-Bandwidth Product	f _T	V _{CE} =5mA, I _C =10V	1	250		MHz
Output Capacitance	Cob	V _{CB} =10V, I _E =0		3.7		pF
		f=1.0MHz			,	
Input Off Voltage	Vi(off)	V _{CE} =5V, I _C =100μA	0.5			V
Input On Voltage	Vi(on)	V _{CF} =0.3V, I _C =20mA			3	V
Input Resistor	R ₁	3-	3.2	4.7	6.2	KΩ
Resistor Ratio	R ₁ /R ₂		0.9	1	1.1	







1000

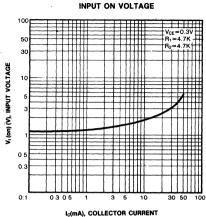
500

300

100

30

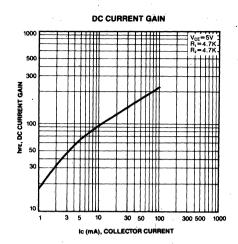
IC(µA), COLLECTOR CURRENT

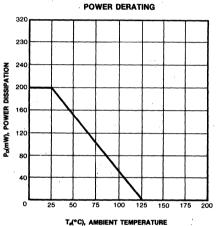


INPUT OFF VOLTAGE

V_I(OFF) (V) INPUT OFF VOLTAGE



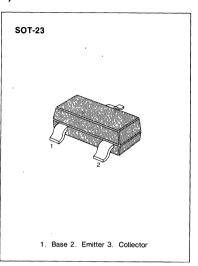




- Switching Circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor ($R_1 = 10K\Omega$, $R_2 = 10K\Omega$)
- Complement to KSR2102

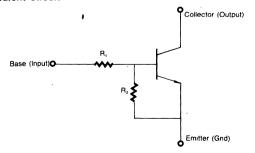
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

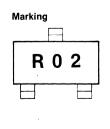
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Junction Temperature Storage Temperature	V _{CBO} V _{CEO} V _{EBO} I _C P _C Tj Tstq	50 50 10 100 200 150 -55~150	V V MA mW °C

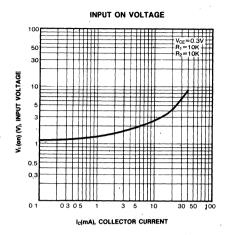


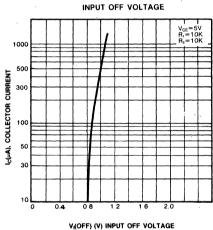
ELECTRICAL CHARACTERISTICS (Ta=25°C)

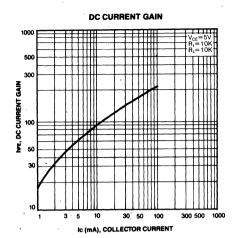
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C}=10\mu A, I_{E}=0$	50			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C}=100\mu A, I_{B}=0$	50			. v
Collector Cutoff Current	I _{CBO}	V _{CB} =40V, I _E =0			0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =5mA	- 20			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =0.5mA			0.3	V
Current Gain-Bandwidth Product	f _T	V _{CE} =5mA, I _C =10V		250		MHz
Output Capacitance	Cob .	V _{CB} =10V, I _E =0		3.7	·	pF
		f=1.0MHz				
Input Off Voltage	Vi(off)	$V_{CE} = 5V, I_{C} = 100 \mu A$	0.5			V
Input On Voltage	Vi(on)	V _{CE} =0.3V, I _C =10mA	1		3	V
Input Resistor	R₁		7	10	13	KΩ
Resistor Ratio	R ₁ /R ₂		0.9	1	1.1	

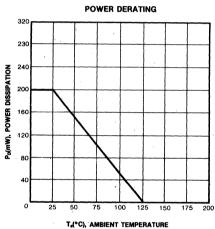








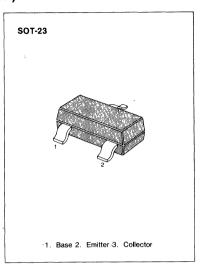




- Switching Circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor ($R_1=22K\Omega$, $R_2=22K\Omega$)
- Complement to KSR2103

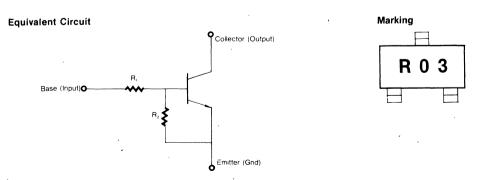
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

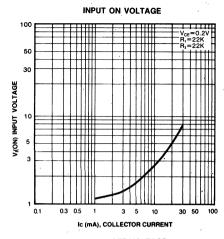
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	V
Collector-Emitter Voltage	V _{CEO}	- 50	V
Emitter-Base Voltage	V _{EBO}	10	V
Collector Current	l _C	100	mA
Collector Dissipation	Pc	200	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55∼150	°C

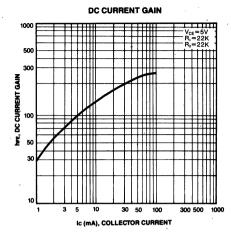


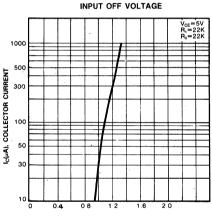
ELECTRICAL CHARACTERISTICS (T_a = 25°C)

Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C}=10\mu A, I_{E}=0$	50			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C}=100\mu A, I_{B}=0$	50			V
Collector Cutoff Current	Ісво	V _{CB} =40V, I _E =0	1		0.1	μΑ .
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =5mA	56			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =0.5mA			0.3	V
Current Gain-Bandwidth Product	f _T	V _{CE} =5mA, I _C =10V		250		MHz
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1.0MHz		3.7		pF
Input Off Voltage	Vi(off)	V _{CE} =5V, I _C =100µA	0.5			v
Input On Voltage	Vi(on)	V _{CE} =0.2V, I _C =5mA			3.0	V
Input Resistor	R ₁		15	22	29	KΩ
Resistor Ratio	R_1/R_2		0.9	1	1.1	

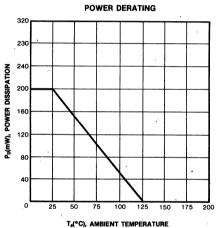








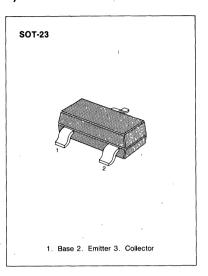
V_I(OFF) (V) INPUT OFF VOLTAGE



- Switching Circuit, Inverter, Interface circuit
 Driver circuit
- Built in bias Resistor ($R_1 = 47K\Omega$, $R_2 = 47K\Omega$)
- Complement to KSR2104

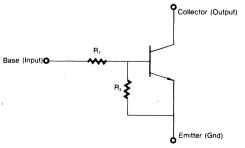
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

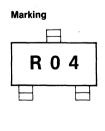
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	V
Collector-Emitter Voltage	V _{CEO}	50	V
Emitter-Base Voltage	V _{EBO}	10	V
Collector Current	Ic	100	mA.
Collector Dissipation	Pc	200	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55~150	°C



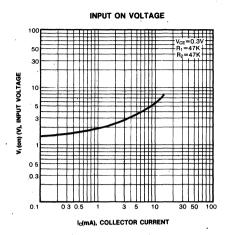
ELECTRICAL CHARACTERISTICS (Ta=25°C)

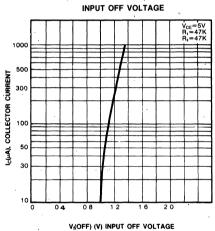
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =10μA, I _E =0	50			· v
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 100 \mu A, I_{B} = 0$	50			V
Collector Cutoff Current	I _{CBO}	V _{CB} =40V, I _E =0			0.1	. μΑ
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =5mA	68			1
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =0.5mA			0.3	V
Current Gain-Bandwidth Product	f _T	V _{CE} =5mA, I _C =10V		250		MHz
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1.0MHz		3.7		pF
Input Off Voltage	Vi(off)	$V_{CE} = 5V$, $I_{C} = 100 \mu A$	0.5			v
Input On Voltage	Vi(on)	V _{CE} =0.3V, I _C =5mA			3	V
Input Resistor	R ₁		32	47	62	ΚΩ
Resistor Ratio	R ₁ /R ₂		0.9	1	1.1	

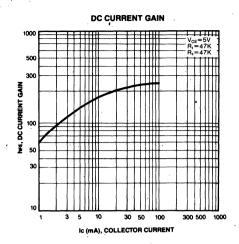


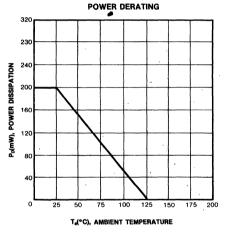








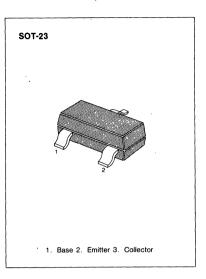




- Switching Circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor (R₁=4.7KΩ, R₂=10KΩ)
- Complement to KSR2105

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

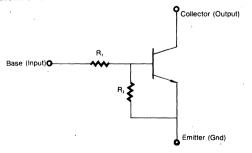
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	V
Collector-Emitter Voltage	V _{CEO}	50	V
Emitter-Base Voltage	· V _{EBO}	10	v
Collector Current (max)	Ic	100	mA
Collector Dissipation	Pc	200	mW
Junction Temperature	Ti	150	°C
Storage Temperature	Tstg	-55~150	°C,



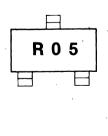
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

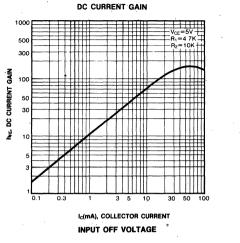
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 10\mu A, I_{E} = 0$	50			v
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =100μA, I _B =0	50			V
Collector Cutoff Current	I _{CBO}	V _{CB} =40V, I _E =0			0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =5mA	30		1	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =0.5mA	ĺ		0.3	V
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1MHz		3.7		рF
Current Gain-Bandwidth Product	f _T	V _{CE} =10V, I _C =5mA		250	1	MHz
Input Off Voltage	Vi(off)	V _{CE} =5V, I _C =100µA	0.3		1	. V
Input On Voltage	Vi(on)	V _{CE} =0.3V, I _C =20mA			2.5	V
Input Resistor	R ₁		32	4.7	6.2	ΚΩ
Resistor Ratio	R ₁ /R ₂		0.42	0.47	0.52	

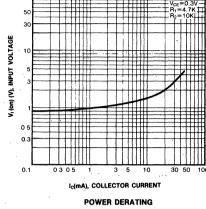
Equivalent Circuit

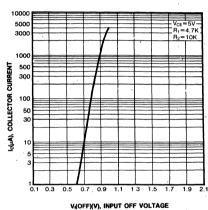


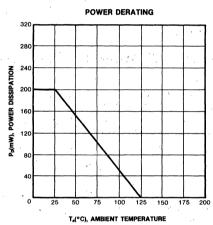
Marking







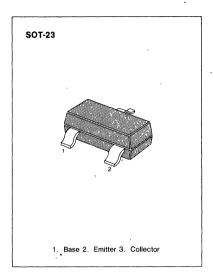




- Switching Circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor ($R_1 = 10K\Omega$, $R_2 = 47K\Omega$)
- Complement to KSR2106

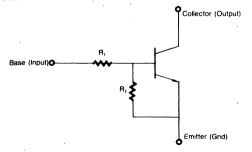
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

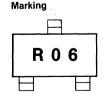
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	V
Collector-Emitter Voltage	V _{CEO}	50	V
Emitter-Base Voltage	V _{EBO}	10	V
Collector Current	lc	100	mA
Collector Dissipation	Pc	200	mW
Junction Temperature	Ti	150	°C
Storage Temperature	Tstg	−55∼150	°C



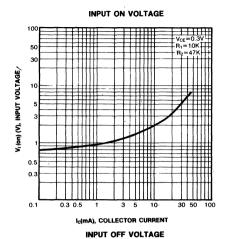
ELECTRICAL CHARACTERISTICS (Ta=25°C)

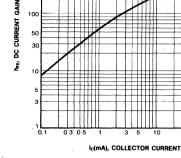
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =10μA, I _E =0	50			ν
Collector-Emitter Breakdown Voltage		Ic=100µA, In=0	50		· ·	v
Collector Cutoff Current	I _{CBO}	V _{CB} =40V, I _E =0			0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =5mA	68		1	•
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =0.5mA			0.3	V
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1MHz		3.7		pF
Current Gain-Bandwidth Product	f _T	V _{CE} =10V, I _C =5mA		250	*	MHz
Input Off Voltage	Vi(off)	V _{CE} =5V, I _C =100μA	0.3			V
Input On Voltage	Vi(on)	V _{CE} =0.3V, I _C =1mA	1	-	1.4	V
Input Resistor	R ₁		7	10	13	KΩ
Resistor Ratio	R ₁ /R ₂		0.19	0.21	0.24	





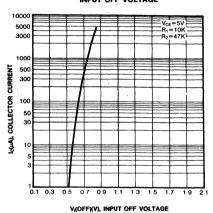
DC CURRENT GAIN

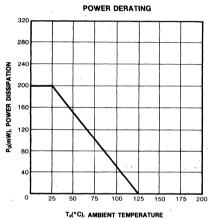




500 300

100

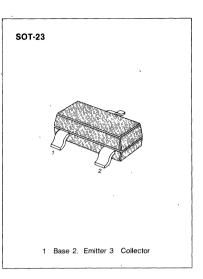




- Switching Circuit, Inverter, Interface circuit
 Driver circuit
- Built in bias Resistor ($R_1 = 22K\Omega$, $R_2 = 47K\Omega$)
- Complement to KSR2107

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

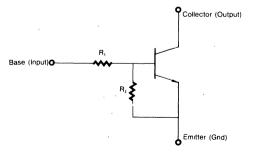
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Junction Temperature Storage Temperature	V _{CBO} V _{CEO} V _{EBO} I _C P _C Tj	50 50 10 100 200 150 -55~150	V V V mA mW °C °C



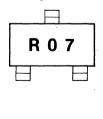
ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C}=10\mu A, I_{E}=0$	50			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C}=100\mu A, I_{B}=0$	50			V
Collector Cutoff Current	I _{CBO}	V _{CB} =40V, I _E =0	:		0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =5mA	68	Į.		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =0.5mA		}	0.3	V
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1MHz		3.7		pF
Current Gain-Bandwidth Product	f⊤	V _{CE} =5mA, I _C =10V	İ	250		MHz
Input Off Voltage	Vi(off)	$V_{CE} = 5V$, $I_{C} = 100 \mu A$	0.4			. v
Input On Voltage	Vi(on)	V _{CE} =0.3V, I _C =2mA			2.5	V
Input Resistor	R ₁		15	22	29	KΩ
Resistor Ratio	R ₁ /R ₂		0.42	0.47	0.52	
			1.			1

Equivalent Circuit



Marking

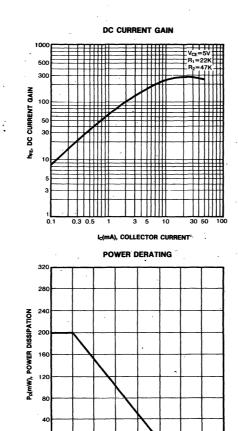


KSR1107

INPUT ON VOLTAGE V, (on) (V), INPUT VOLTAGE 0.1 Ic(mA), COLLECTOR CURRENT INPUT OFF VOLTAGE 10000 5000 -V_{CE}=5V 3000 1000 500 CURRENT 300 Ic(MA), COLLECTOR 100

0.7 0.9 1.1 1.3 1.5 1.7

V(OFF)(V), INPUT OFF VOLTAGE

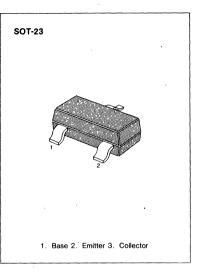


T_s(°C), AMBIENT TEMPERATURE

- Switching Circuit, Inverter, Interface circuit
 Driver circuit
- Built in bias Resistor (R₁=47K Ω , R₂=22K Ω)
- Complement to KSR2108

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

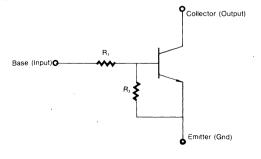
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	v
Collector-Emitter Voltage	V _{CEO}	50	V
Emitter-Base Voltage	V _{EBO}	10	V
Collector Current	lc	100	mA
Collector Dissipation	Pc	200	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	- 55∼150	°C

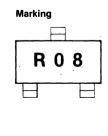


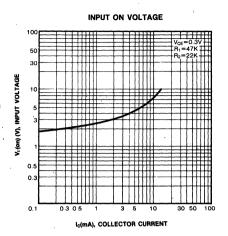
ELECTRICAL CHARACTERISTICS (Ta=25°C)

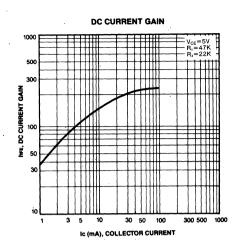
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =10μA, I _E =0	50			٧
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C}=100\mu A, I_{B}=0$	50		·	V
Collector Cutoff Current	Ісво	V _{CB} =40V, I _E =0		٠ .	0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =5mA	56			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =0.5mA			0.3	V
Current Gain-Bandwidth Product	f _T	V _{CE} =5mA, I _C =10V		250		MHz
Output Capacitance	Cob	$V_{CB} = 10V, I_{E} = 0$ f = 1.0MHz		3.7		pF
Input Off Voltage	Vi(off)	V _{CE} =5V, I _C =100μA	0.8			V
Input On Voltage	Vi(on)	V _{CE} =0.3V, I _C =2mA			4	V
Input Resistor	R ₁		32	47	62	ΚΩ
Resistor Ratio	R ₁ /R ₂		1.9	2.1	2.4	

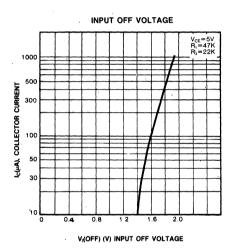


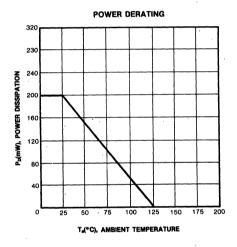










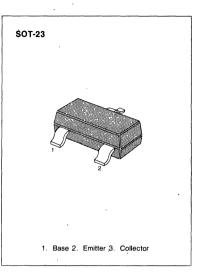


- Switching Circuit, Inverter, Interface circuit

 Driver circuit
- Built in bias Resistor (R=4.7KΩ)
- Complement to KSR2109

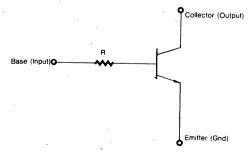
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

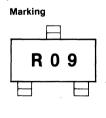
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	40	V
Collector-Emitter Voltage	V _{CEO}	40	V
Emitter-Base Voltage	V _{EBO}	5	V
Collector Current	l _c	100	mA
Collector Dissipation	Pc	200	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55∼150	, °C

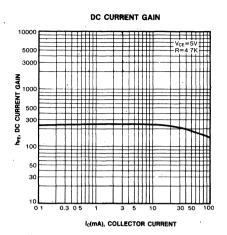


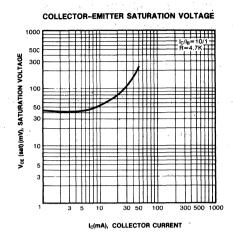
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

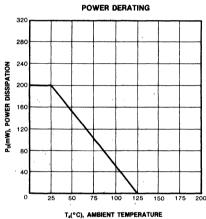
Characteristic	Symbol	Test Condition	. Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =100μA, I _E =0	40			v
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =1mA, I _B =0	40			V
Collector Cutoff Current	I _{CBO}	V _{CB} =30V, I _E =0		'	0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =1mA	100		600	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1mA	Ì		0.3	V
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1MHz	,	3.70	,	pF
Current Gain-Bandwidth Product	fT	V _{CE} =10V, I _C =5mA	ł	250		MHz
Input Resistor	R		3.2	4.7	6.2	ΚΩ







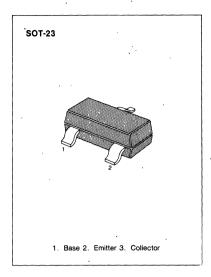




- Switching Circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor (R=10KΩ)
- Complement to KSR2110

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

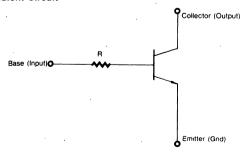
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Junction Temperature	V _{CBO} V _{CEO} V _{EBO} I _C P _C Ti	40 40 5 100 200	V V MA mW
Storage Temperature	Tstg	-55 ~ 150	°C



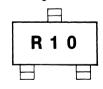
ELECTRICAL CHARACTERISTICS (Ta=25°C)

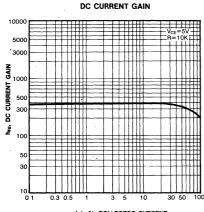
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =100μA, I _E =0	40			V
Emitter-Emitter Breakdown Voltage	BV _{CEO}	I _E =1mA, I _B =0	40	İ	ļ	V
Collector Cutoff Current	Ісво	V _{CB} =30V, I _E =0			0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =1mA	100		600	•
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1mA		j	0.3	V
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1MHz		3.7		pF
Current Gain-Bandwidth Product	fT	V _{CE} =10V, I _C =5mA		250		MHz
Input Resistor	R		7	10	13	ΚΩ

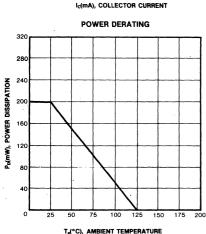


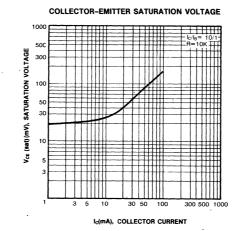


Marking





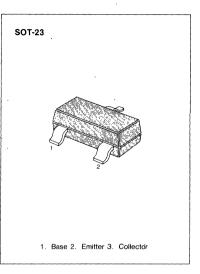




- Switching Circuit, Inverter, Interface circuit
 Driver circuit
- Built in bias Resistor (R=22KΩ)
- Complement to KSR2111

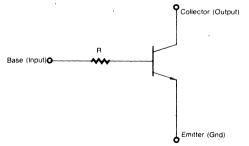
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

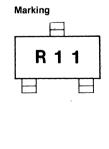
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Junction Temperature Storage Temperature	V _{CBO} V _{CEO} V _{EBO} I _C P _C Tj Tsta	40 40 5 100 200 150 -55~150	V V W MA mW °C °C



ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =100μA, I _E =0	40			V
Emitter-Emitter Breakdown Voltage	BV _{CEO}	$I_E=1$ mA, $I_B=0$	40			V
Collector Cutoff Current	Iceo	V _{CB} =30V, I _E =0			0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =1mA	100		600	1
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1mA		·	0.3	V
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1MHz		3.7		pF
Current Gain-Bandwidth Product	f⊤	V _{CE} =10V, I _C =5mA	ļ	250		MHz
Input Resistor	R		15	,22	29	KΩ

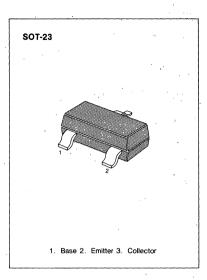




- Switching Circuit, Inverter, Interface circuit
 Driver circuit
- Built in bias Resistor (R=47KΩ)
- Complement to KSR2112

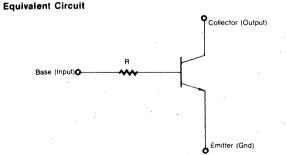
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

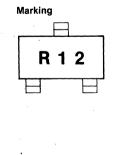
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Junction Temperature Storage Temperature	V _{CBO} V _{CEO} V _{EBO} I _C P _C Tj	40 40 5 100 200 150 -55~150	∨ ∨ ∨ mA mW °C °C



ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =100μA, I _E =0	40	,		V
Emitter-Emitter Breakdown Voltage	BV _{CEO}	I _E =1mA, I _B =0	40			V
Collector Cutoff Current	ICBO	V _{CB} =30V, I _E =0			0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =1mA	100		600	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1mA			0.3	V
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1MHz		3.7		pF
Current Gain-Bandwidth Product	f⊤	V _{CE} =10V, I _C =5mA		250		MHz
Input Resistor	R		32	47	62	ΚΩ

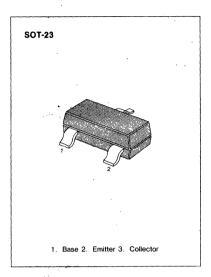




- . Switching circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor($R_1 = 2.2K\Omega$, $R_2 = 47K\Omega$)
- Complement to KSR2113

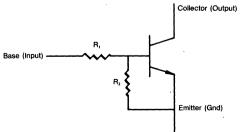
ABSOLUTE MAXIMUM RATINGS $(T_a = 25$ °C)

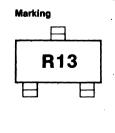
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	٧
Collector-Emitter Voltage	V _{CEO}	50	V
Emitter-Base Voltage	V _{EBO}	10	V
Collector Current	l _c	100	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55 ~ 150	°C



ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CEO}	I _C =10μΑ, I _E =0	50			٧
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C}=100\mu A, I_{B}=0$	50			٧
Collector Cutoff Current	Iceo	V _{CB} =40V, I _E =0			0.1	μΑ
DC Current Gain	h _{FE} .	V _{CE} =5V, I _C =5mA	68			·
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 10 \text{mA}, I_{B} = 0.5 \text{mA}$	}		0.3	V
Current Gain-Bandwidth Product	f _T	$V_{CE}=5mA$, $I_{C}=10V$		250		MHz
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1.0MHz		3.7		pF
Input Off Voltage	Vi(off)	V _{CE} =5V, I _C =100µA	0.5			v
Input On Voltage	Vi(on)	V _{CE} =0.2V, I _C =5mA			1.1	V
Input Resistor	R ₁		1.5	2.2	2.9	KΩ
Resistor Ratio	R ₁ /R ₂		0.042	0.047	0.052	



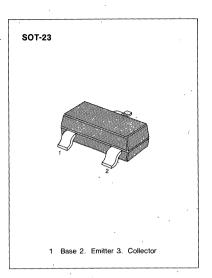




- Switching circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor($R_1 = 4.7 K\Omega$, $R_2 = 47 K\Omega$)
- Complement to KSR2114

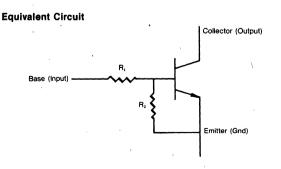
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

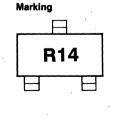
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	V
Collector-Emitter Voltage	V _{CEO}	50	V
Emitter-Base Voltage	V _{EBO}	10	V
Collector Current	Ic	100	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55 ~ 150°	°C



ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CEO}	I _C =10μA, I _E =0	50			٧
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C}=100\mu A, I_{B}=0$	50			٧
Collector Cutoff Current	I _{CBO}	V _{CB} =40V, I _E =0			0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =5mA	68		{	•,
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =0.5mA	}		0.3	V
Current Gain-Bandwidth Product	f _T	V _{CE} =5mA, I _C =10V	}	250		MHz
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1.0MHz		3.7		pF
Input Off Voltage	Vi(off)	V _{CE} =5V, I _C =100μA	0.5		١	V
Input On Voltage	Vi(on)	V _{CE} =0.2V, I _C =5mA			1.3	V
Input Resistor	R,		3.2	4.7	6.2	KΩ
Resistor Ratio	R ₁ /R ₂		0.09	0.1	0.11	

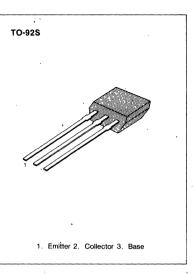




- Switching circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor (R₁=4.7K Ω , R₂=4.7K Ω)
- Complement to KSR2201

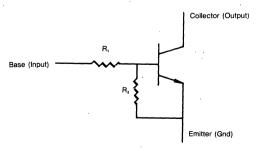
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

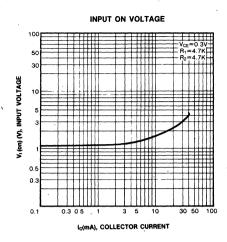
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	v
Collector-Emitter Voltage	V _{CEO}	50	V
Emitter-Base Voltage	V _{EBO}	10	V
Collector Current	· lc	100	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55 ~ 150	°C

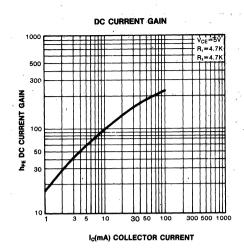


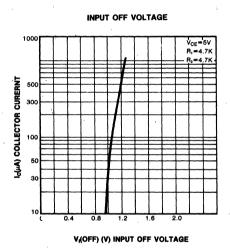
ELECTRICAL CHARACTERISTICS (Ta=25°C)

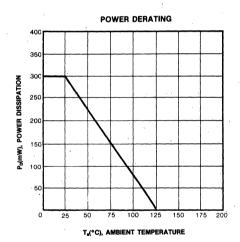
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CEO}	$I_{c}=10 \mu\text{A}$ $I_{E}=0$	50			v
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 100 \mu A, I_{B} = 0$	50			V
Collector Cutoff Current	Ісво	V _{CB} =40V, I _E =0	}		0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =10mA	20			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =0.5mA			0.3	V
Current Gain-Bandwidth Product	f _T	V _{CE} =5mA, I _C =10V		250		MHz
Output Capacitance	Cob	V _{CB} =10V, I _E =0		3.7		pF
		f=1.0MHz				
Input Off Voltage	Vi(off)	V _{CE} =5V, I _C =100μA	0.5			V
Input On Voltage	Vi(on)	V _{CE} =0.3V, I _C =20mA			3	V
Input Resistor	R ₁		3.2	4.7	6.2	KΩ
Resistor Ratio	R_1/R_2 .		0.9	1	1.1	







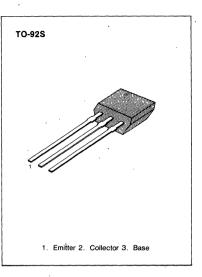




- Switching circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor ($R_1 = 10K\Omega$, $R_2 = 10K\Omega$)
- Complement to KSR2202

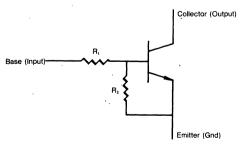
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

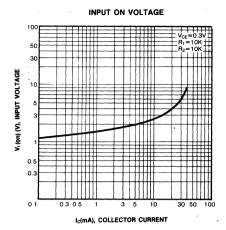
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	V
Collector-Emitter Voltage	V _{CEO}	50	V
Emitter-Base Voltage	V _{EBO}	10	V
Collector Current	Ic	100	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55~150	°C.

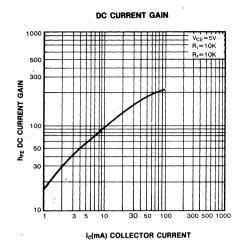


ELECTRICAL CHARACTERISTICS (Ta=25°C)

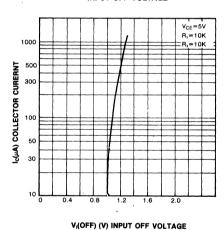
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CEO}	$I_{C}=10\mu A, I_{E}=0$	50	<i>:</i>		v
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C}=100\mu A, I_{B}=0$	50	}		V
Collector Cutoff Current	I _{CBO}	V _{CB} =40V, I _E =0	(0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =5mA	30			•
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =0.5mA	1		0.3	V
Current Gain-Bandwidth Product	fT	V _{CE} =5mA, I _C =10V	1	250		MHz
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1.0MHz		3.7		pF
Input Off Voltage	Vi(off)	V _{CE} =5V, I _C =100μA	0.5	ì		V
Input On Voltage	Vi(on)	V _{CE} =0.3V, I _C =10mA	ĺ		3	v
Input Resistor	R ₁		7	10	13	ΚΩ
Resistor Ratio	R ₁ /R ₂		0.9	1.	1.1	

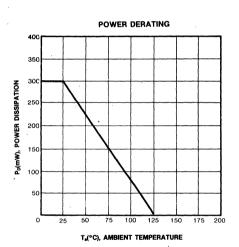






INPUT OFF VOLTAGE

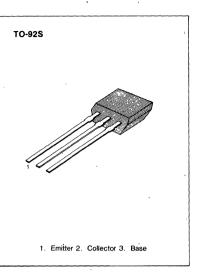




- Switching circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor ($R_1 = 22K\Omega$, $R_2 = 22K\Omega$)
- Complement to KSR2203

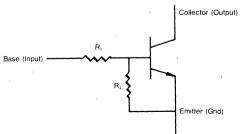
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

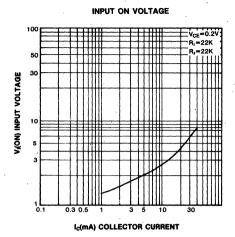
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	V
Collector-Emitter Voltage	V _{CEO}	50	V
Emitter-Base Voltage	V _{EBO}	10	V
Collector Current	l _c	100	mA .
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55 ~ 150	°C

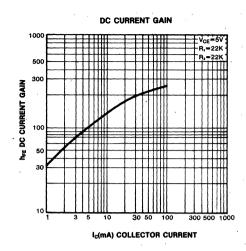


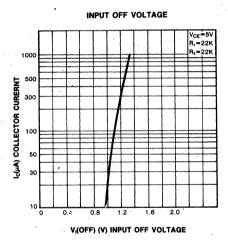
ELECTRICAL CHARACTERISTICS (Ta=25°C)

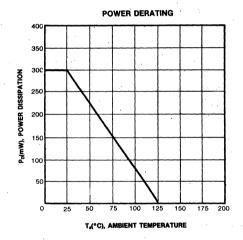
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CEO}	$I_{C}=10\mu A, I_{E}=0$	50			·v
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C}=100\mu A, I_{B}=0$	50			V
Collector Cutoff Current	Ісво	V _{CB} =40V, I _E =0			0.1	μА
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =5mA	56		}	·
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =0.5mA		j	0.3	V
Current Gain-Bandwidth Product	fT	V _{CE} =5mA, I _C =10V		250		MHz
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1.0MHz		3.7		рF
Input Off Voltage	Vi(off)	V _{CE} =5V, I _C =100μA	0.5			V
Input On Voltage	Vi(on)	$V_{CE} = 0.2V, I_{C} = 5mA$	1		3.0	V
Input Resistor	R ₁		15	22	29	KΩ
Resistor Ratio	R_1/R_2		0.9	1	1.1	







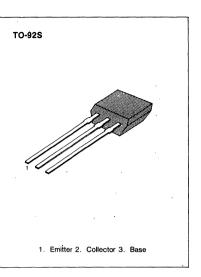




- Switching circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor (R₁=47K Ω , R₂=47K Ω)
- Complement to KSR2204

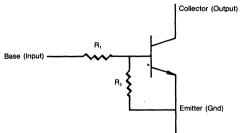
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

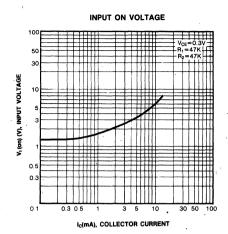
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	V
Collector-Emitter Voltage	V _{CEO}	50	V
Emitter-Base Voltage	V _{EBO}	10	v i
Collector Current	lc	100	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55 ~ 150	°C

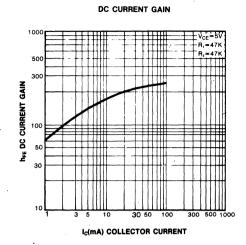


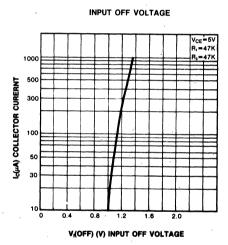
ELECTRICAL CHARACTERISTICS (Ta=25°C)

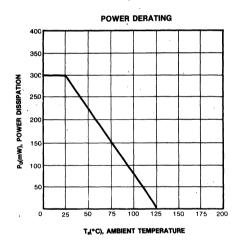
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CEO}	I _C =10μA, I _E =0	50		,	v
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C}=100\mu A, I_{B}=0$	50			· V
Collector Cutoff Current	Ісво	V _{CB} =40V, I _E =0			0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =5mA	68			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =0.5mA			0.3	V
Current Gain-Bandwidth Product	f⊤	V _{CE} =5mA, I _C =10V		250		MHz
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1.0MHz		3.7		pF
Input Off Voltage	Vi(off)	$V_{CE} = 5V, I_{C} = 100 \mu A$	0.5			V
Input On Voltage	Vi(on)	V _{CE} =0.3V, I _C =5mA			3	V
Input Resistor	R ₁		- 32	47	62	ΚΩ
Resistor Ratio	R ₁ /R ₂		0.9	1	1.1	







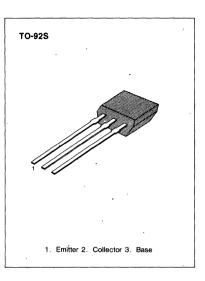




- Switching Circuit, Inverter, Interface circuit
 Driver circuit
- Built in bias Resistor (R₁=4.7KΩ, R₂=10KΩ)
- Complement to KSR2205

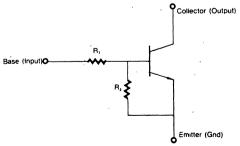
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

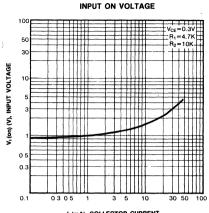
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	v
Collector-Emitter Voltage	V _{CEO}	50	· v
Emitter-Base Voltage	V _{EBO}	10	V
Collector Current	lc	100	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55~150	°C



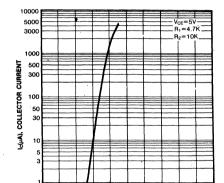
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CEO}	I _C =10μA, I _E =0	50	i		v
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C}=100\mu A, I_{B}=0$	50			V
Collector Cutoff Current	I _{CBO}	V _{CB} =40V, I _E =0			0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =5mA	30			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =0.5mA			0.3	V
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1MHz		3.7		pF
Current Gain-Bandwidth Product	f⊤	V _{CE} =10V, I _C =5mA		250	j	MHz
Input Off Voltage	Vi(off)	V _{CE} =5V, I _C =100μA	0.3			V
Input On Voltage	Vi(on)	V _{CE} =0.3V, I _C =20mA			2.5	V
Input Resistor	R ₁		32	4.7	6.2	ΚΩ
Resistor Ratio	R ₁ /R ₂		0.42	0.47	0.52	

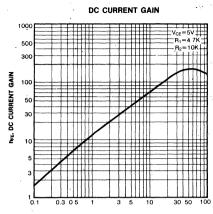




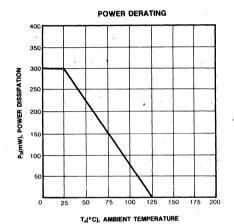
I_C(mA), COLLECTOR CURRENT INPUT OFF VOLTAGE



V_I(OFF)(V), INPUT OFF VOLTAGE



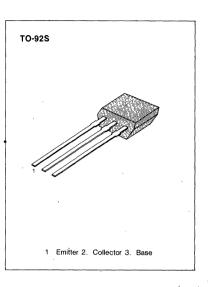
Ic(mA), COLLECTOR CURRENT



- Switching Circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor ($R_1=10K\Omega$, $R_2=47K\Omega$)
- Complement to KSR2206

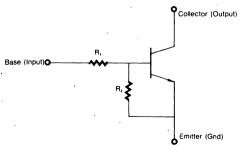
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

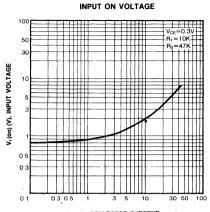
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	V
Collector-Emitter Voltage	V _{CEO}	50	V
Emitter-Base Voltage	V _{EBO}	10	V
Collector Current	lc	100	mA
Collector Dissipation	P _c	300	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55∼150	°C



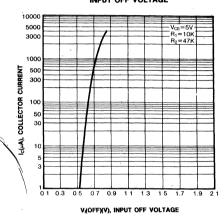
ELECTRICAL CHARACTERISTICS (Ta=25°C)

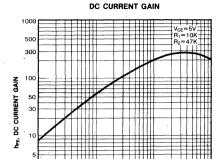
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CEO}	I _C =10μA, I _E =0	50			٧
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C}=100\mu A, I_{B}=0$	50			V
Collector Cutoff Current	Icao	V _{CB} =40V, I _E =0			0.1	μΑ
DC Current Gain	h _{EE}	V _{CE} =5V, I _C =5mA	68			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =0.5mA	,		0.3	٧
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1MHz		3.7		pF
Current Gain-Bandwidth Product	f _T	V _{CE} =10V, I _C =5mA		250		MHz
Input Off Voltage	Vi(off)	V _{CE} =5V, I _C =100μA	0.3			V
Input On Voltage	Vi(on)	$V_{CE} = 0.3V, I_{C} = 1 mA$			1.4	V
Input Resistor	R ₁		7	10	13	KΩ
Resistor Ratio	R ₁ /R ₂		0.19	0,21	0.24	



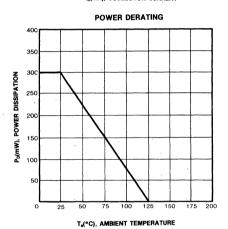








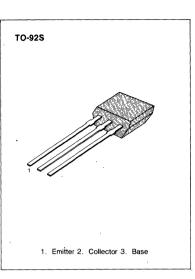
Ic(mA), COLLECTOR CURRENT



- Switching Circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor (R₁=22KΩ, R₂=47KΩ)
- Complement to KSR2207

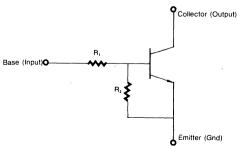
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

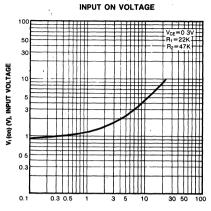
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Junction Temperature Storage Temperature	VCBO VCEO VEBO IC PC Tj Tstg	50 50 10 100 300 150 -55~150	V V WA mW °C °C



ELECTRICAL CHARACTERISTICS (Ta=25°C)

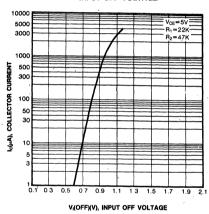
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CEO}	$I_{C}=10\mu A, I_{E}=0$	50			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C}=100\mu A, I_{B}=0$	50			V
Collector Cutoff Current	Ісво	V _{CB} =40V, I _E =0	1		0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =5mA	68			1.
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =0.5mA			0.3	V
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1MHz		3.7		pF
Current Gain-Bandwidth Product	f _T	V _{CE} =5mA, I _C =10V	1	250		MHz
Input Off Voltage	Vi(off)	V _{CE} =5V, I _C =100μA	0.4			V
Input On Voltage	Vi(on)	$V_{CE}=0.3V$, $I_{C}=2mA$			2.5	V
Input Resistor	R ₁		15	22	29	KΩ
Resistor Ratio	R ₁ /R ₂		0.42	0.47	0.52	







INPUT OFF VOLTAGE



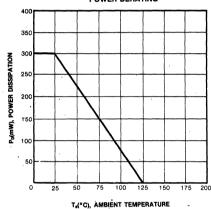
1000 V_{CR}=0V R_R=2V R_R=2V R_R=2X R_R=2X R_R=3X

DC CURRENT GAIN

Ic(mA), COLLECTOR CURRENT

0.3 0.5

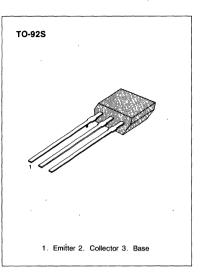
POWER DERATING



- Switching circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor (R₁=47K Ω , R₂=22K Ω)
- Complement to KSR2208

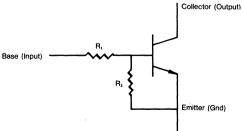
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

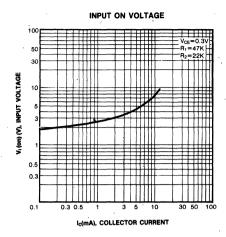
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	V
Collector-Emitter Voltage	V _{CEO}	50	V
Emitter-Base Voltage	V _{EBO}	· 10	V
Collector Current	l _c	100	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55~150	°C

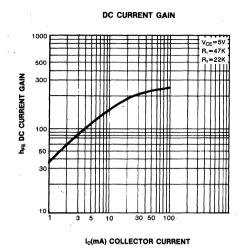


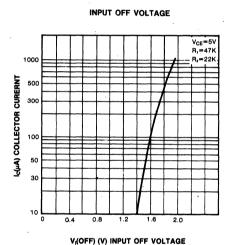
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

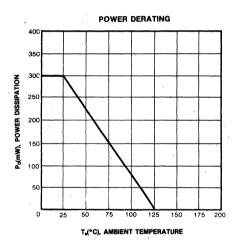
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CEO}	I _C =10μA, I _E =0	50			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C}=100\mu A, I_{B}=0$	50			V
Collector Cutoff Current	I _{CBO}	V _{CB} =40V, I _E =0			0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =5mA	56			-
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =0.5mA			0.3	V
Current Gain-Bandwidth Product	f _T	V _{CE} =5mA, I _C =10V		250		MHz
Output Capacitance	Cob	$V_{CB} = 10V, I_{E} = 0$ f=1.0MHz		3.7		pF
Input Off Voltage	Vi(off)	V _{CE} =5V, I _C =100μA	. 0.8			V
Input On Voltage	Vi(on)	V _{CE} =0.3V, I _C =2mA			4	V
Input Resistor	R ₁		32	47	62	· KΩ
Resistor Ratio	R ₁ /R ₂		1.9	2.1	2.4	







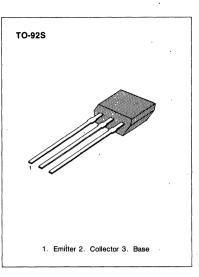




- Switching Circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor (R=4.7KΩ)
- Complement to KSR2209

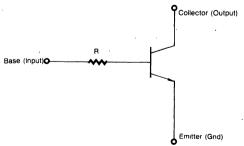
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

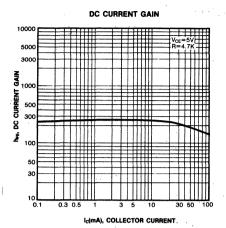
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	40	v
Collector-Emitter Voltage	V _{CEO}	40	v
Emitter-Base Voltage	V _{EBO}	5	V
Collector Current	Ic	100	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj	150 .	°C
Storage Temperature	Tstg	. −55 ~ 150	°C

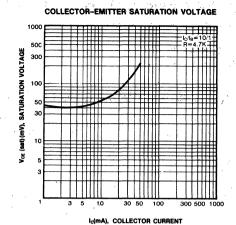


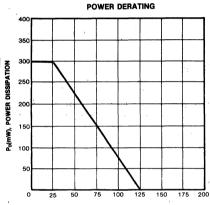
ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CEO}	I _C =100μA, I _E =0	40			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =1mA, I _B =0	40			V
Collector Cutoff Current	I _{CBO}	V _{CB} =30V, I _E =0			0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =1mA	100		600	1
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1mA]		0.3	V
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1MHz		3.70		pF
Current Gain-Bandwidth Product	f _T	V _{CE} =10V, I _C =5mA		250		MHz
Input Resistor	R		3.2	4.7	6.2	KΩ





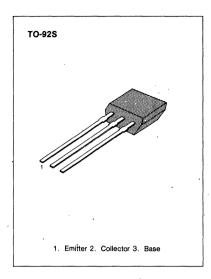




- Switching Circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor (R=10KΩ)
- Complement to KSR2210

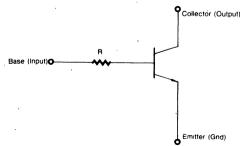
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

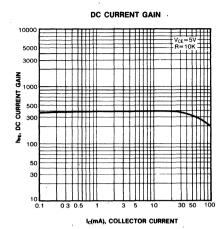
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	40	V
Collector-Emitter Voltage	V _{CEO}	40	V
Emitter-Base Voltage	V _{EBO}	5 .	V
Collector Current	Ic	100	mA .
Collector Dissipation	Pc	300	mW
Junction Temperature	Ti	150	°C
Storage Temperature	Tstg	-55~150	, °C

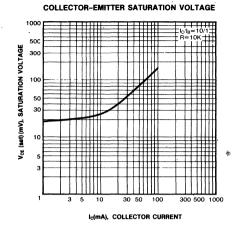


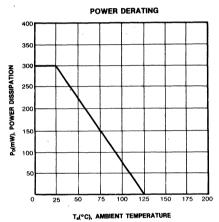
ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =100μA, I _E =0	40			V
Emitter-Emitter Breakdown Voltage	BV _{CEO}	$I_E=1 \text{ mA}, I_B=0$	40			V
Collector Cutoff Current	Сво	V _{CB} =30V, I _E =0			0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =1mA	100		600	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1mA			0.3	V
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1MHz		3.7		pF
Current Gain-Bandwidth Product	f _T	V _{CE} =10V, I _C =5mA		250	•	MHz
Input Resistor	R		7	10	13	ΚΩ





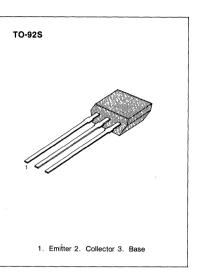




- Switching Circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor (R=22KΩ)
- Complement to KSR2211

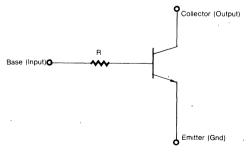
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	40	V
Collector-Emitter Voltage	V _{CEO}	40	V
Emitter-Base Voltage	V_{EBO}	5	V
Collector Current	lc	100	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55∼150	°C



ELECTRICAL CHARACTERISTICS (Ta=25°C)

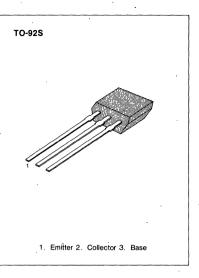
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =100μA, I _E =0	40			v
Emitter-Emitter Breakdown Voltage	BV _{CEO}	$I_E=1$ mA, $I_B=0$	40		İ	V
Collector Cutoff Current	I _{CBO}	V _{CB} =30V, I _E =0	1		0.1	μА
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =1mA	100		600	''
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1mA			0.3	V
Output Capacitance	Cob	$V_{CB}=10V$, $I_{E}=0$ f=1MHz		3.7		pF
Current Gain-Bandwidth Product	f⊤	V _{CE} =10V, I _C =5mA		250		MHz
Input Resistor	R		15	22	29	KΩ



- Switching Circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor (R=47KΩ)
- Complement to KSR2212

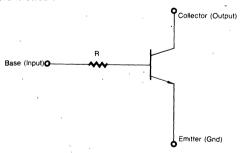
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage	V _{CBO}	. 40 40	V
Emitter-Base Voltage	V _{EBO} ;	5	V
Collector Current Collector Dissipation	I _C P _C	100 300	mA mW
Junction Temperature Storage Temperature	Tj Tstg	150 -55 ~ 150	°C °C



ELECTRICAL CHARACTERISTICS (Ta=25°C)

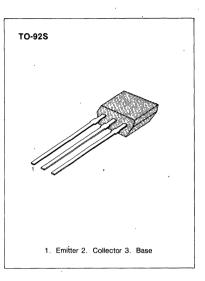
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =100μA, I _E =0	40			V
Emitter-Emitter Breakdown Voltage	BV _{CEO}	$I_E=1 \text{ mA}, I_B=0$	40	1 .	,	V
Collector Cutoff Current	I _{CBO}	V _{CB} =30V, I _E =0			0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =1mA	100		600	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1mA			0.3	·v
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1MHz		3.7		pF
Current Gain-Bandwidth Product	f _{T.}	V _{CE} =10V, I _C =5mA		250		MHz
Input Resistor	R		32	47	62	KΩ



- Switching circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor($R_1 = 2.2K\Omega$, $R_2 = 47K\Omega$)
- Complement to KSR2213

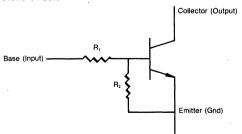
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	. 50	V
Collector-Emitter Voltage	V _{CEO}	50	V
Emitter-Base Voltage	V _{EBO}	10	l v
Collector Current	l _c	100	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj .	150	°C
Storage Temperature	Tstg	−55~150 <u> </u>	°C



ELECTRICAL CHARACTERISTICS (Ta=25°C)

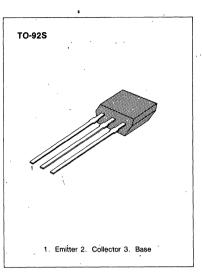
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CEO}	I _C =10μA, I _E =0	50			>
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 100 \mu A, I_{B} = 0$	50	1		V
Collector Cutoff Current	I _{CBO}	V _{CB} =40V, I _E =0			0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =5mA	68			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =0.5mA			0.3	V
Current Gain-Bandwidth Product	f⊤	V _{CE} =5mA, I _C =10V		250		MHz
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1.0MHz		3.7		pF
Input Off Voltage	Vi(off)	V _{CF} =5V, I _C =100μA	0.5			v
Input On Voltage	Vi(on)	V _{CE} =0.2V, I _C =5mA			1.1	V
Input Resistor	R ₁	. 3	1.5	2.2	2.9	ΚΩ
Resistor Ratio	R ₁ /R ₂		0.042	0.047	0.052	



- Switching circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor($R_1 = 4.7K\Omega$, $R_2 = 47K\Omega$)
- Complement to KSR2214

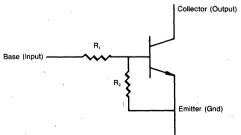
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	. 50	V
Collector-Emitter Voltage	V _{CEO}	50	V
Emitter-Base Voltage	V _{EBO}	10	V
Collector Current	Ic	100	mA
Collector Dissipation	Pc	300	mΨ
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55 ~ 150	°C



ELECTRICAL CHARACTERISTICS (Ta=25°C)

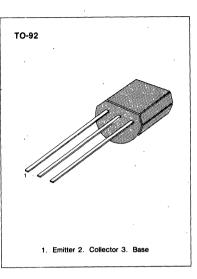
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CEO}	I _C =10μΑ, I _E =0	50			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C}=100\mu A, I_{B}=0$	50			V
Collector Cutoff Current	I _{CBO}	V _{CB} =40V, I _E =0	}		0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =5mA	68			· ·
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =0.5mA	}		0.3	V
Current Gain-Bandwidth Product	f _T	V _{CE} =5mA, I _C =10V		250		MHz
Output Capacitance	Cob	V _{CB} =10V, I _E =0		3.7		pF
		f=1.0MHz	(
Input Off Voltage	Vi(off)	V _{CE} =5V, I _C =100μA	0.5			V
Input On Voltage	Vi(on)	V _{CE} =0 2V, I _C =5mA			1.3	V
Input Resistor	.R₁		3.2	. 4.7	6.2	ΚΩ
Resistor Ratio	R ₁ /R ₂		0.09	0.1	0.11	



- Switching circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor (R₁=4.7K Ω , R₂=4.7K Ω)
- Complement to KSR1001

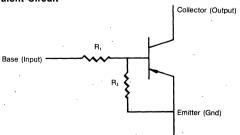
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

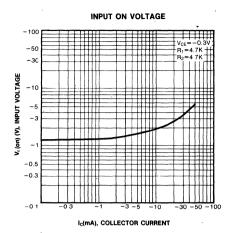
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-50	٧
Collector-Emitter Voltage	V _{CEO} .	-50	V
Emitter-Base Voltage	V _{EBO}	-10	V
Collector Current	lc	-100	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55 ~ 150	°C

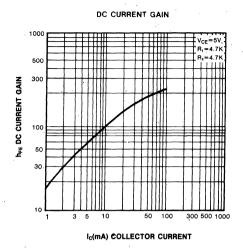


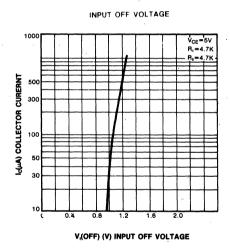
ELECTRICAL CHARACTERISTICS (Ta=25°C)

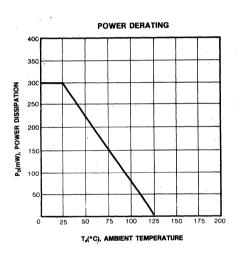
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = -10\mu A, I_{E} = 0$	-50			٧
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -100 \mu A, I_{B} = 0$	-50			V
Collector Cutoff Current	I _{CBO}	$V_{CB} = -40V, I_{E} = 0$			-0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = -5V$, $I_{C} = -10mA$	20			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -10 \text{mA}, I_{B} = -0.5 \text{mA}$			-0.3	٧
Current Gain-Bandwidth Product	f⊤	$V_{CE}=-5$ mA, $I_{C}=-10$ V		200		MHz
Output Capacitance	Cob	$V_{CB} = -10V, I_{E} = 0$ f = 1.0MHz	!	5.5		pF
Input Off Voltage	Vi(off)	$V_{CE} = -5V$, $I_{C} = -100\mu A$	-0.5			v
Input On Voltage	Vi(on)	$V_{CE} = -0.3V$, $I_{C} = -20mA$			-3	٧.
Input Resistor	R ₁		3.2	4.7	6.2	ΚΩ
Resistor Ratio	R ₁ /R ₂		0,9	1	1.1	







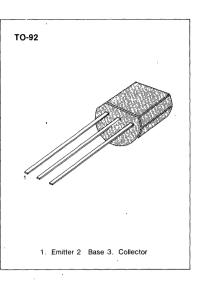




- Switching circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor ($R_1 = 10 \text{K}\Omega$, $R_2 = 10 \text{K}\Omega$)
- Complement to KSR1002

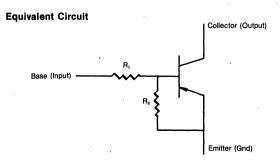
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

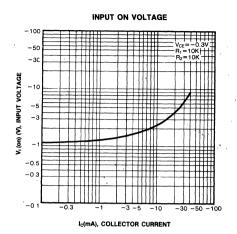
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-50	٧
Collector-Emitter Voltage	V _{CEO}	-50	٧.
Emitter-Base Voltage	. V _{EBO}	-10	V
Collector Current	l _C	-100	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55 ~ 150	°C

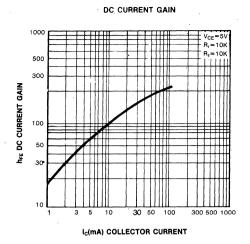


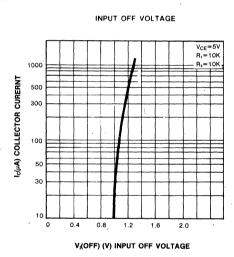
ELECTRICAL CHARACTERISTICS (Ta=25°C)

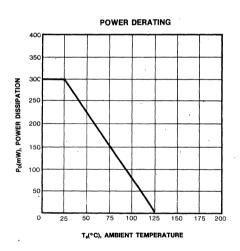
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{c} = -10\mu A, I_{E} = 0$	50			v
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -100 \mu A, I_{B} = 0$	-50			V
Collector Cutoff Current	I _{CBO}	V _{CB} =-40V, I _E =0			-0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = -5V$, $I_C = -5mA$	30			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -10 \text{mA}, I_{B} = -0.5 \text{mA}$			-0.3	. V
Current Gain-Bandwidth Product	f _T	$V_{CE} = -5 \text{mA}, I_{C} = -10 \text{V}$		200		MHz
Output Capacitance	Cob	$V_{CB} = -10V, I_{E} = 0$		5.5	ļ	pF
		f=1.0MHz				
Input Off Voltage	Vi(off)	$V_{CE} = -5V, I_{C} = -100\mu A$	-0.5	}		V
Input On Voltage	Vi(on)	$V_{CE} = -0.3V$, $I_{C} = -10mA$			-3	V
Input Resistor	R ₁		7	10	13	ΚΩ
Resistor Ratio	R_1/R_2		0.9	1	1.1	







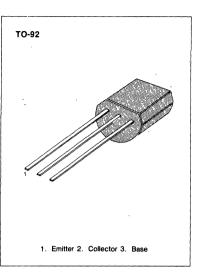




- Switching circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor(R₁=22KΩ, R₂=22KΩ)
- Complement to KSR1003

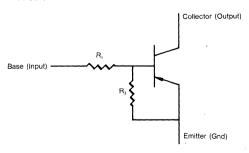
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

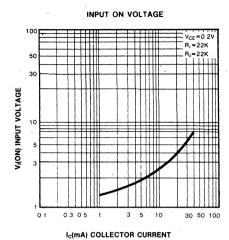
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Junction Temperature Storage Temperature	V _{CBO} V _{CEO} V _{EBO} I _C P C Tj Tstg	-50 -50 -10 -100 300 150 -55~150	V V WA mW °C °C

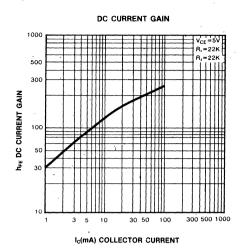


ELECTRICAL CHARACTERISTICS (Ta=25°C)

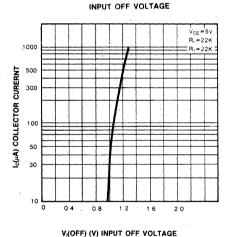
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =-10μA, I _E =0	-50			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -100 \mu A, I_{B} = 0$	-50			V
Collector Cutoff Current	Ісво	V _{CB} =-40V, I _E =0			-0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = -5V, I_{C} = -5mA$	56			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -10 \text{mA}, I_{B} = -0.5 \text{mA}$			-0.3	٧
Current Gain-Bandwidth Product	f _T	$V_{CE} = -5 \text{mA}, I_{C} = -10 \text{V}$		200	İ	MHz
Output Capacitance	Cob	$V_{CB} = -10V, I_{E} = 0$		5.5	1	pF
		f=1.0MHz			į	
Input Off Voltage	Vi(off)	$V_{CE} = -5V$, $I_{C} = -100\mu A$	-0.5			V
Input On Voltage	Vi(on)	$V_{CE} = -0.2V$, $I_{C} = -5mA$			-3.0	V
Input Resistor	R₁		15	22	29	KΩ
Resistor Ratio	R_1/R_2		0.9	1	1.1	

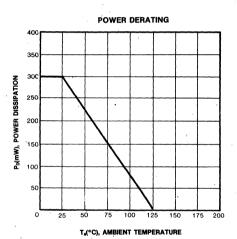








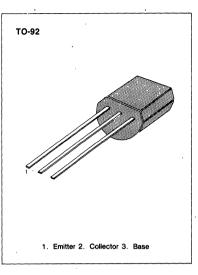




- Switching circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor (R₁=47KΩ, R₂=47KΩ)
- Complement to KSR1004

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

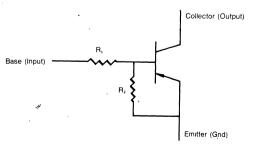
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-50	٧
Collector-Emitter Voltage	V _{CEO}	-50	Ų
Emitter-Base Voltage	V _{EBO}	-10	V
Collector Current	lc	-100	mA
Collector Dissipation	Pc	300 、	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55 ~ 150	°C

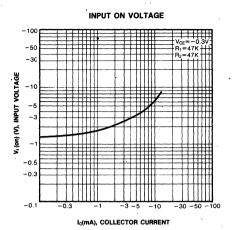


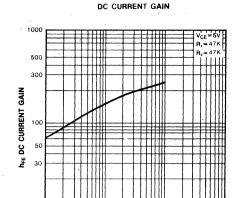
ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = -10\mu A, I_{E} = 0$	-50			٧
Collector-Emitter Breakdown Voltage	BV_{CEO}	$I_{C} = -100 \mu A, I_{B} = 0$	-50			V
Collector Cutoff Current	I _{CBO}	$V_{CB} = -40V, I_{E} = 0$			-0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = -5V, I_{C} = -5mA$	68			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -10 \text{mA}, I_{B} = -0.5 \text{mA}$			-0.3	٧
Current Gain-Bandwidth Product	f _T	$V_{CE} = -5 \text{mA}, I_{C} = -10 \text{V}$		200	1	MHz
Output Capacitance	Cob	$V_{CB} = -10V, I_{E} = 0$		5.5		pF
·		f=1.0MHz				
Input Off Voltage	Vi(off)	$V_{CE} = -5V$, $I_{C} = -100 \mu A$	-0.5			V
Input On Voltage	Vi(on)	$V_{CE} = -0.3V$, $I_{C} = -10mA$			-3	٧
Input Resistor	R₁		32	47	62	KΩ
Resistor Ratio	R ₁ /R ₂	1	0.9	1 .	1.1	

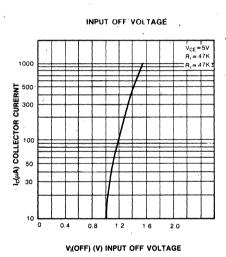
Equivalent Circuit

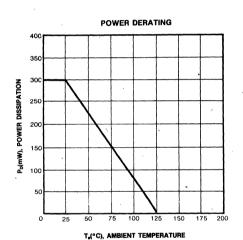






Ic(mA) COLLECTOR CURRENT

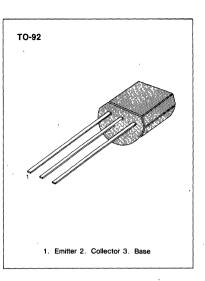




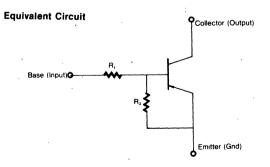
- Switching Circuit, Inverter, Interface circuit
 Driver circuit
- Built in bias Resistor ($R_1 = 4.7K\Omega$, $R_2 = 10K\Omega$)
- Complement to KSR1005

ABSOLUTE MAXIMUM RATINGS $(T_a=25^{\circ}C)$

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-50	٧
Collector-Emitter Voltage	V _{CEO}	-50	V
Emitter-Base Voltage	V _{EBO}	-10	V
Collector Current	lc	-100	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55 ~ 150	°C



Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = -10\mu A, I_{E} = 0$	-50			v
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -100 \mu A, I_{B} = 0$	-50	,		V
Collector Cutoff Current	Ісво	$V_{CB} = -40V, I_{E} = 0$			-0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = -5V, I_{C} = -5mA$	30			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -10 \text{mA}, I_{B} = -0.5 \text{mA}$			-0.3	V
Current Gain-Bandwidth Product	Cob	$V_{CB} = -10V, I_{E} = 0$		5.5		pF
	,	f=1MHz			•	
Current Gain-Bandwidth Product	f _T	$V_{CE} = -10V, I_{C} = -5mA$		200		MHz
Input Off Voltage	Vi(off)	$V_{CE} = -5V$, $I_{C} = -100 \mu A$	-0.3			V
Input On Voltage	Vi(on)	$V_{CE} = -0.3V$, $I_{C} = -20mA$			-2.5 ⁻	V
Input Resistor	R ₁		3.2	4.7	6.2	KΩ
Resistor Ratio	R_1/R_2	,	0.42	0.47	0.52	



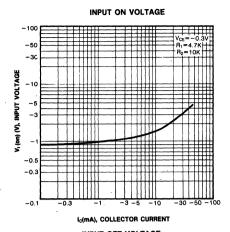
-1000

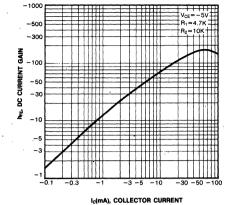
Ic(MA), COLLECTOR CURRENT

-500

-10

DC CURRENT GAIN





INPUT OFF VOLTAGE -10000 -5000 -3000



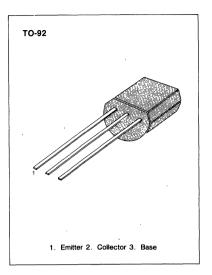
V_{CE}=-5\ R₁=4.7K R₂=10K -0.1 -0.3 -0.5 -0.7 -0.9 -1.1 -1.3 -1.5 -1.7 -1.9 -2.1 V₍OFF)(V), INPUT OFF VOLTAGE

POWER DERATING 400 350 300 250 100 o. 125 150 175 25 Ta(°C), AMBIENT TEMPERATURE

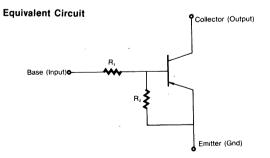
- Switching Circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor ($R_1=10K\Omega$, $R_2=47K\Omega$)
- Complement to KSR1006

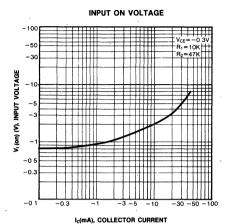
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Junction Temperature	V _{CBO} V _{CEO} V _{EBO} I _C P _C Tj	-50 -50 -10 -100 300 150	V V V mA mW
Junction Temperature Storage Temperature	Tj Tstg		150 -55~150

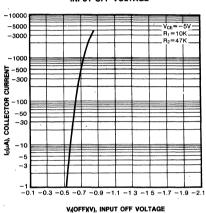


Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = -10\mu A, I_{E} = 0$	-50	• .		٧
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -100 \mu A, I_{B} = 0$	-50			V
Collector Cutoff Current	I _{CBO}	$V_{CB} = -40V, I_{E} = 0$			-0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = -5V, I_{C} = -5mA$	68			·
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -10 \text{mA}, I_{B} = -0.5 \text{mA}$			-0.3	V
Output Capacitance	Cob	$V_{CB} = -10V, I_{E} = 0$ f = 1 MHz		. 5.5	,	pF
Current Gain-Bandwidth Product	f _T .	$V_{CE} = -10V, I_{C} = -5mA$	1	200		MHz
Input Off Voltage	Vi(off)	$V_{CE} = -5V$, $I_{C} = -100\mu A$	-0.3			V .
Input On Voltage	Vi(on)	$V_{CE} = -0.3V$, $I_{C} = -1 \text{mA}$			-1.4	· v
Input Resistor	R₁		7	10	13	KΩ
Resistor Ratio	R ₁ /R ₂		0.19	0.21	0.24	.*

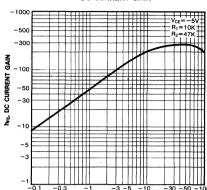




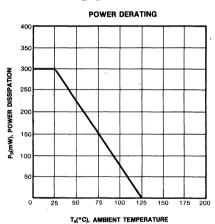




DC CURRENT GAIN



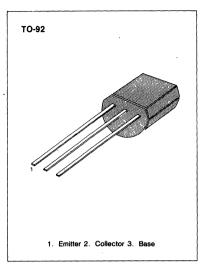
Ic(mA), COLLECTOR CURRENT



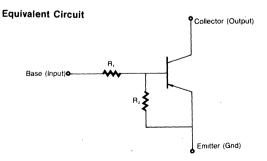
- Switching Circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor ($R_1 = 22K \Omega R_2 = 47K\Omega$)
- Complement to KSR1007

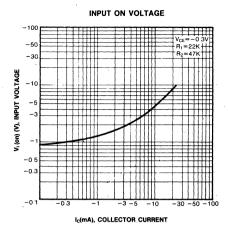
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	· V _{CBO}	-50	v
Collector-Emitter Voltage	V _{CEO}	-50	V
Emitter-Base Voltage	V _{EBO}	-10	V
Collector Current	l _C	-100	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55~150	°C

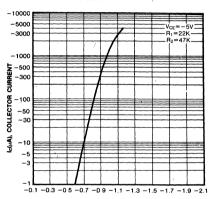


Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =-10μΑ, I _E =0	-50			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -100 \mu A, I_{B} = 0$	-50			V
Collector Cutoff Current	I _{CBO}	V _{CB} =-40V, I _E =0			-0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = -5V$, $I_{C} = -5mA$	68			·
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -10 \text{mA}, I_{B} = -0.5 \text{mA}$			-0.3	V
Current Gain-Bandwidth Product	Cob	$V_{CB} = -10V, I_{E} = 0$ f=1MHz		5.5		рF
Current Gain-Bandwidth Product	f _T	V _{CE} =-10V, I _C =-5mA		200		MHz
Input Off Voltage	Vi(off)	V _{CE} =-5V, I _C =-100μA	-0.4			V
Input On Voltage	Vi(on)	$V_{CE} = -0.3V$, $I_{C} = -2mA$			-2.5	V
Input Resistor	R₁		15	22	29	ΚΩ
Resistor Ratio	R ₁ /R ₂		0.42	0.47	0.52	



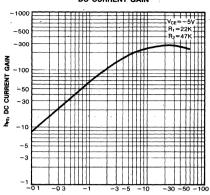


INPUT OFF VOLTAGE

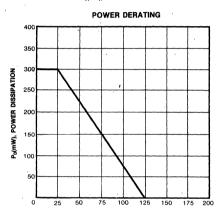


V(OFF)(V), INPUT OFF VOLTAGE

DC CURRENT GAIN



Ic(mA), COLLECTOR CURRENT

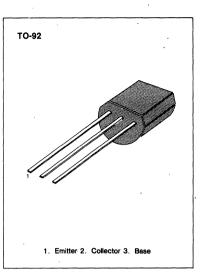


Ta(°C), AMBIENT TEMPERATURE

- Switching circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor ($R_1 = 47K\Omega$, $R_2 = 22K\Omega$)
- Complement to KSR1008

ABSOLUTE MAXIMUM RATINGS $(T_a = 25$ °C)

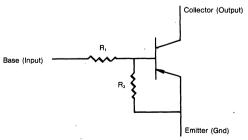
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-50	٧
Collector-Emitter Voltage	V _{CEO}	-50	V
Emitter-Base Voltage	V _{EBO}	-10	V
Collector Current	l _c	-100	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55 ~ 150	°C

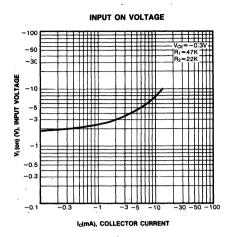


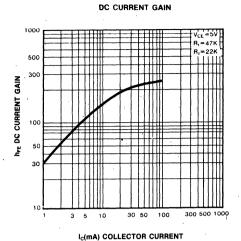
ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =-10μΑ, I _E =0	-50			v
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -100 \mu A$, $I_{B} = 0$	-50			v
Collector Cutoff Current	Ісво	V _{CB} =-40V, I _E =0	,	,	-0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE}=-5V$, $I_{C}=-5mA$	56			i i
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -10 \text{mA}, I_{B} = -0.5 \text{mA}$			-0.3	l v
Current Gain-Bandwidth Product	f _T	$V_{CE} = -5 \text{mA}, I_{C} = -10 \text{V}$		200		MHz
Output Capacitance	Cob	V _{CB} =-10V, I _E =0		5.5		рF
		f=1.0MHz				١.,
Input Off Voltage	Vi(off)	$V_{CE} = -5V$, $I_{C} = -100\mu A$	-0.8			V
Input On Voltage	Vi(on)	$V_{CE} = -0.3V, I_{C} = -2mA$			-4	V
Input Resistor	R ₁	İ	32	47	62	KΩ
Resistor Ratio	R ₁ /R ₂		1.9	2.1	2.4	

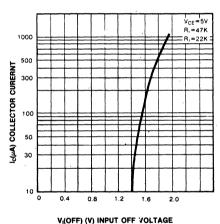
Equivalent Circuit

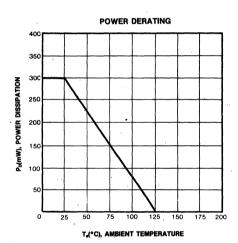








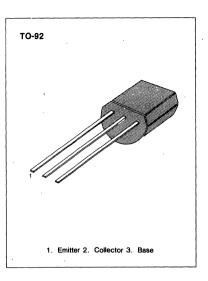




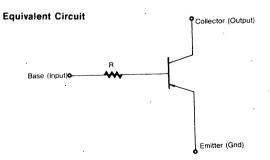
- Switching Circuit, Inverter, Interface circuit
 Driver circuit
- Built in bias Resistor (R=4.7KΩ)
- Complement to KSR1009

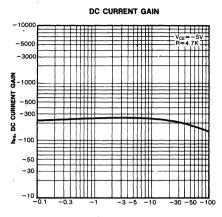
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

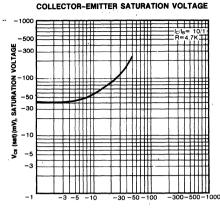
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-40	V
Collector-Emitter Voltage	V _{CEO}	-40	V
Emitter-Base Voltage	V _{EBO}	-5	V
Collector Current	l _C	100	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Тj	150	°C
Storage Temperature	Tstg	−55∼150	°C



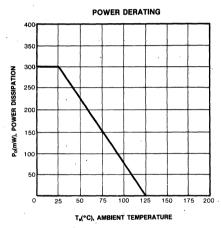
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =-100μA, I _E =0	-40			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C = -1 \text{ mA}, I_B = 0$	-40		l	v
Collector Cutoff Current	I _{CBO}	V _{CB} =-30V, I _E =0			-0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = -5V, I_{C} = -1mA$	100	}	600	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =-10mA, I _B =-1mA			-0.3	V.
Output Capacitance	Cob	$V_{CB} = -10V$, $I_E = 0$ f = 1MHz		5.5		pF
Current Gain-Bandwidth Product	f _T	V _{CE} =-10V, I _C =-5mA	j	200	}	MHz
Input Resistor	R ₁		3.2	4.7	. 6.2	KΩ









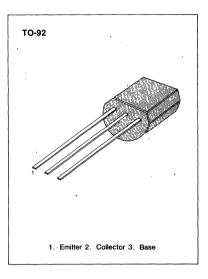


Ic(mA), COLLECTOR CURRENT

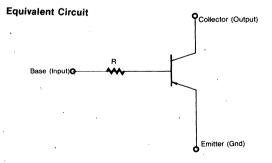
- Switching Circuit, Inverter, Interface circuit
 Driver circuit
- Built in bias Resistor (R=10K)
- Complement to KSR1010

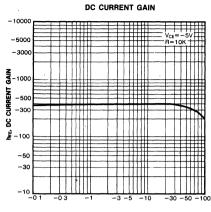
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

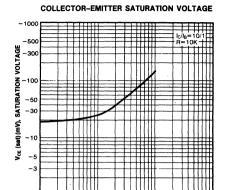
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-40	٧
Collector-Emitter Voltage	V _{CEO}	-40	V
Emitter-Base Voltage	V _{EBO}	-5	V
Collector Current	l _c	-100	mA
Collector Dissipation	Pc	. 300	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55 ~ 150	°C ′



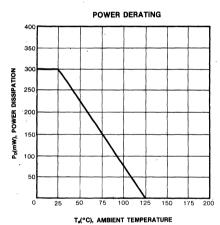
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =-100μA, I _E =0	-40			v .
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{E} = -1 \text{mA}, I_{B} = 0$	-40			V
Collector Cutoff Current	Ісво	$V_{CB} = -30V, I_E = 0$			-0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = -5V$, $I_{C} = -1mA$	100		600	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = -10 \text{mA}, I_B = -1 \text{mA}$			0.3	V
Output Capacitance	Cob	V _{CB} =-10V, I _E =0 f=1MHz		5.5		pF
Current Gain-Bandwidth Product	f _T	$V_{CE} = -10V$, $I_{C} = -5mA$	_	200		MHz
Input Resistor	R		7	10	13	ΚΩ









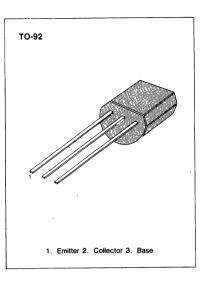


Ic(mA), COLLECTOR CURRENT

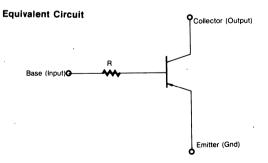
- Switching Circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor (R=22K Ω)
- Complement to KSR1011

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	40	V
Collector-Emitter Voltage	V _{CEO}	-40	V
Emitter-Base Voltage	V _{EBO}	-5	V
Collector Current	l _C	-100	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55∼150	°C



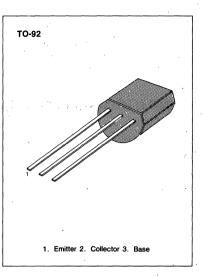
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =-100μA, I _E =0	-40			v
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_E = -1 \text{ mA}, I_B = 0$	-40			٧
Collector Cutoff Current	I _{CBO}	$V_{CB} = -30V, I_{E} = 0$			-0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE}=-5V$, $I_{C}=-1mA$	100		600	-
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = -10 \text{mA}, I_B = -1 \text{mA}$			-0.3	V
Output Capacitance	Cob	$V_{CB}=-10V$, $I_E=0$ f=1MHz		5.5		pF
Current Gain-Bandwidth Product	. f _T	$V_{CE} = -10V, I_{C} = -5mA$		200		MHz
Input Resistor	R		15	22	29	KΩ



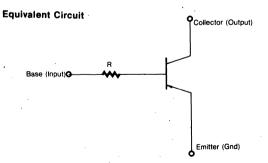
- Switching Circuit, Inverter, Interface circuit
 Driver circuit
- Built in bias Resistor (R=47K Ω)
- Complement to KSR1012

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-4Ó	. V
Collector-Emitter Voltage	V _{CEO}	-40	V
Emitter-Base Voltage	V _{EBO}	-5	V
Collector Current	l _C	-100	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55 ~ 150	°C



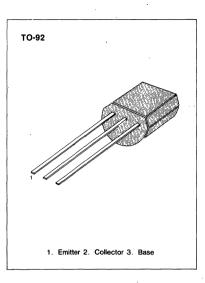
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =-100μA, I _E =0	-40			v
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -1 \text{mA}, I_{B} = 0$	-40			v
Collector Cutoff Current	Ісво	V _{CB} =-30V, I _E =0		1	-0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = -5V$, $I_{C} = -1mA$	100		600	-
Collector Emitter Saturation Voltage	V _{CE} (sat)	I _C =-10mA, I _B =-1mA			-0.3	l v
Output Capacitance	Cob	V _{CB} =-10V, I _E =0 f=1MHz	,	5.5	0.0	pF
Current Gain Bandwidth Product	f _T	$V_{CE} = -10V, I_{C} = -5mA,$		200		MHz
Input Resistor	R		32	47	62	ΚΩ



- Switching circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor ($R_1 = 2.2K\Omega$, $R_2 = 47K\Omega$)
- Complement to KSR1013

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

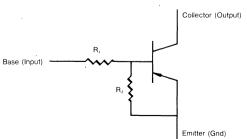
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-50	٧
Collector-Emitter Voltage	V _{CEO}	-50	V
Emitter-Base Voltage	V _{EBO}	-10	V
Collector Current .	l _c	-100	mΑ
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55 ~ 150	°C



ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = -10\mu A, I_{E} = 0$	-50			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -100 \mu A, I_{B} = 0$	-50			V ·
Collector Cutoff Current	I _{CBO}	$V_{CB} = -40V, I_{E} = 0$			-0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = -5V, I_{C} = -5mA$	68			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -10 \text{mA}, I_{B} = -0.5 \text{mA}$			-0.3	V
Current Gain-Bandwidth Product	f⊤	$V_{CE} = -5 \text{mA}, I_{C} = -10 \text{V}$		200		MHz
Output Capacitance	Cob	V _{CB} =-10V, I _E =0 f=1.0MHz		5.5		pF
Input Off Voltage	Vi(off)	$V_{CE} = -5V, I_{C} = -100\mu A$	-0.5			V
Input On Voltage	Vi(on)	$V_{CE} = -0.2V$, $I_{C} = -10mA$			-1.1	V
Input Resistor	R ₁		1.5	2.2	2.9	ΚΩ
Resistor Ratio	R ₁ /R ₂		0.042	0.047	0.052	

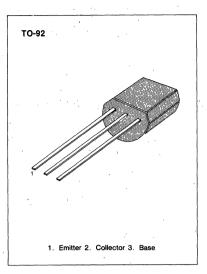
Equivalent Circuit



- Switching circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor (R₁ = 4.7KΩ, R₂ = 47KΩ)
- Complement to KSR1014

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

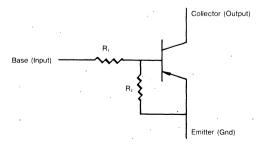
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-50	٧.
Collector-Emitter Voltage	V _{CEO}	-50	V
Emitter-Base Voltage	V _{EBO}	-10	V
Collector Current	l _c	-100	mA
Collector Dissipation	.Pc	300	mW
Junction Temperature	Tj	150	. °C
Storage Temperature	Tstg	−55 ~ 150	°C



ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =-10μA, I _E =0	-50			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -100 \mu A, I_{B} = 0$	-50			V
Collector Cutoff Current	I _{CBO}	$V_{CB} = -40V, I_E = 0$			-0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = -5V, I_{C} = -5mA$	68			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -10 \text{mA}, I_{B} = -0.5 \text{mA}$			-0.3	V
Current Gain-Bandwidth Product	f _T	$V_{CE} = -5 \text{mA}, I_{C} = -10 \text{V}$		200		MHz
Output Capacitance	Cob	V _{CB} =−10V, I _E =0 f=1.0MHz		5.5		pF
Input Off Voltage	Vi(off)	$V_{CE} = -5V$, $I_{C} = -100\mu A$	-0.5		:	V
Input On Voltage	Vi(on)	$V_{CE} = -0.2V$, $I_{C} = -5mA$			-1.3	V
Input Resistor	R ₁		3.2	4.7	6.2	· KΩ
Resistor Ratio	R ₁ /R ₂		0.09	0.1	0.11	

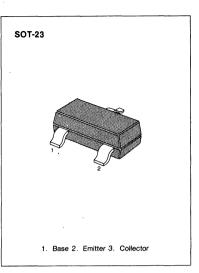
Equivalent Circuit



- Switching Circuit, Inverter, Interface circuit
 Driver circuit
- Built in bias Resistor (R₁=4.7KΩ, R₂=4.7KΩ)
- Complement to KSR1101

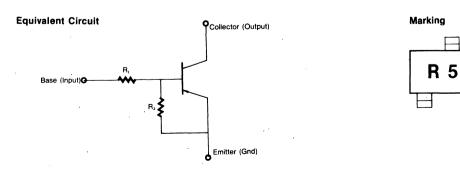
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

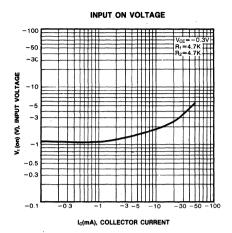
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-50	٧
Collector-Emitter Voltage	V _{CEO} .	-50	V
Emitter-Base Voltage	V _{EBO}	-10	V
Collector Current	l _c	-100	mA
Collector Dissipation	Pc	200	mW
Junction Temperature	Tj ·	150	°C
Storage Temperature	Tstg	−55 ~ 150	°C

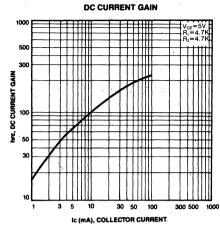


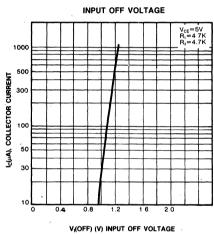
ELECTRICAL CHARACTERISTICS (T_a=25°C)

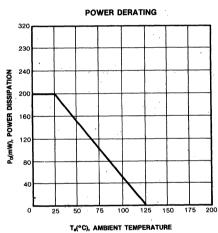
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = -10\mu A, I_{E} = 0$	-50			v
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -100 \mu A, I_{B} = 0$	-50			V
Collector Cutoff Current	I _{CBO}	$V_{CB} = -40V, I_{E} = 0$			− 0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = -5V$, $I_{C} = -10mA$	·30			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -10 \text{mA}, I_{B} = -0.5 \text{mA}$			-0.3	V
Current Gain-Bandwidth Product	f _T	$V_{CE} = -5 \text{mA}, I_{C} = -10 \text{V}$		200		MHz
Output Capacitance	Cob	$V_{CB} = -10V, I_{E} = 0$ f=1.0MHz		5.5		pF
Input Off Voltage	Vi(off)	$V_{CE} = -5V$, $I_{C} = -100\mu A$	-0.5			V
Input On Voltage	Vi(on)	$V_{CE} = -0.3V$, $I_{C} = -20mA$			-3	V
Input Resistor	R ₁		3.2	4.7	6.2	KΩ
Resistor Ratio	R_1/R_2		0.9	1	1.1	







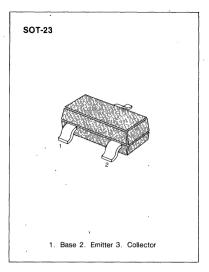




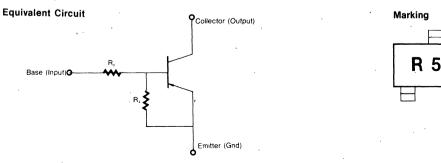
- · Switching Circuit, Inverter, Interface circuit **Driver circuit**
- Built in bias Resistor (R₁=10KΩ, R₂=10KΩ)
- Complement to KSR1102

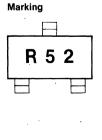
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

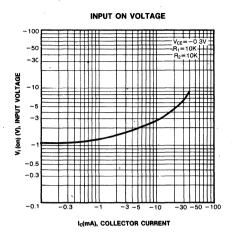
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-50	٧
Collector-Emitter Voltage	V _{CEO}	-50	V
Emitter-Base Voltage	V _{EBO}	-10	V
Collector Current	Ic	-100	mA
Collector Dissipation	· Pc	200	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55∼150	°C

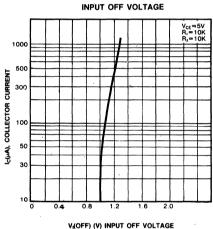


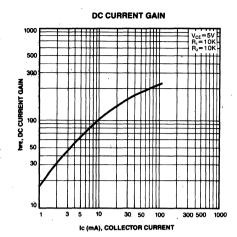
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
.Collector-Base Breakdown Voltage	BV _{CBO}	I _C =-10μA, I _E =0	-50			٧
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -100 \mu A, I_{B} = 0$	-50	j		V
Collector Cutoff Current	Ісво	V _{CB} =-40V, I _E =0			-0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = -5V$, $I_{C} = -5mA$. 30			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -10 \text{mA}, I_{B} = -0.5 \text{mA}$			-0.3	٧
Current Gain-Bandwidth Product	f _T	$V_{CE} = -5mA$, $I_{C} = -10V$		200		MHz
Output Capacitance	Cob	$V_{CB} = -10V, I_{E} = 0$		5.5		pF
	انيه	f=1.0MHz				i
Input Off Voltage	Vi(off)	$V_{CE} = -5V$, $I_{C} = -100\mu A$	-0.5			V
Input On Voltage	Vi(on)	$V_{CE} = -0.3V$, $I_{C} = -10mA$			-3	٧
Input Resistor	R ₁ .		7	10	13	KΩ
Resistor Ratio	R ₁ /R ₂		0.9	1	1.1	

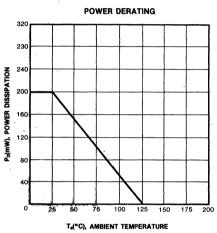








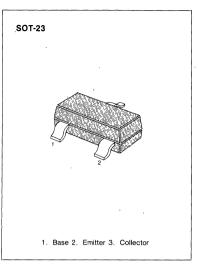




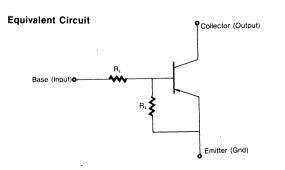
- Switching Circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor ($R_1=22K\Omega$, $R_2=22K\Omega$)
- Complement to KSR1103

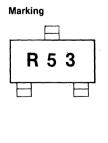
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

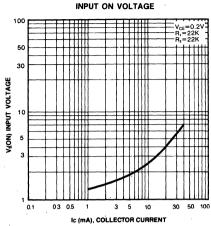
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-50	٧
Collector-Emitter Voltage	V _{CEO}	-50	V
Emitter-Base Voltage	V _{EBO}	-10	V
Collector Current	l _C	-100	mA
Collector Dissipation	Pc	200	mW
Junction Temperature	Ti	150	°C
Storage Temperature	Tstg	-55∼150	°C

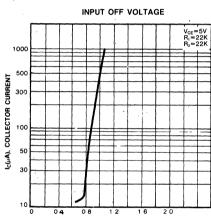


Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =-10μA, I _E =0	-50			٧
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -100 \mu A$, $I_{B} = 0$	-50			V
Collector Cutoff Current	I _{CBO}	$V_{CB} = -40V, I_E = 0$			-0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = -5V$, $I_C = -5mA$	56			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -10 \text{mA}, I_{B} = -0.5 \text{mA}$			-0.3	V
Current Gain-Bandwidth Product	f _T	$V_{CE} = -5mA$, $I_C = -10V$		200	}	MHz
Output Capacitance	Cob	V _{CB} =-10V, I _E =0 f=1.0MHz		5.5		pF
Input Off Voltage	Vi(off)	$V_{CE} = -5V$, $I_{C} = -100\mu A$	-0.5			v
Input On Voltage	Vi(on)	$V_{CE} = -0.2V$, $I_{C} = -5mA$			-3.0	V
Input Resistor	R ₁		15	22	29	KΩ
Resistor Ratio	R ₁ /R ₂		0.9	1	1.1	

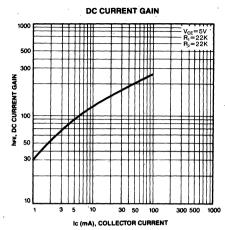


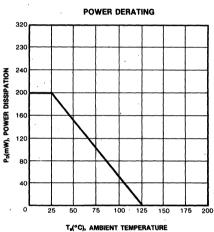






V(OFF) (V) INPUT OFF VOLTAGE

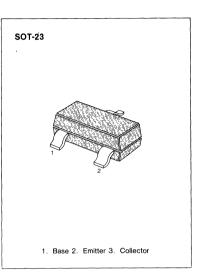




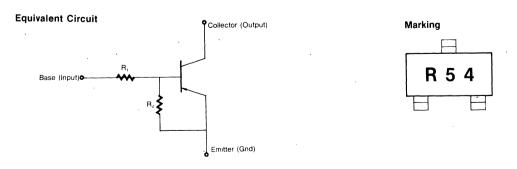
- Switching Circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor (R₁=47KΩ, R₂=47KΩ)
- Complement to KSR1104

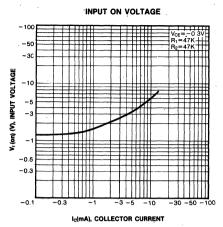
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

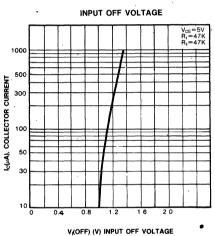
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Junction Temperature Storage Temperature	VCBO VCEO VEBO Ic Pc Tj	-50 -50 -10 -100 200 150 -55~150	V V WA mW °C °C

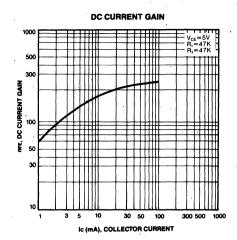


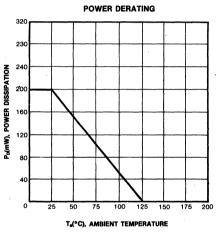
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = -10\mu A, I_{E} = 0$	-50			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -100 \mu A, I_{B} = 0$	-50			V
Collector Cutoff Current	I _{CBO}	$V_{CB} = -40V, I_E = 0$			-0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = -5V, I_{C} = -5mA$	68			·
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -10 \text{mA}, I_{B} = -0.5 \text{mA}$			-0.3	V
Current Gain-Bandwidth Product	f _T	$V_{CE} = -5 \text{mA}, I_{C} = -10 \text{V}$		200		MHz
Output Capacitance	Cob	$V_{CB} = -10V, I_E = 0$	· ·	5.5		рF
	1	f=1.0MHz				
Input Off Voltage	Vi(off)	$V_{CE} = -5V$, $I_{C} = -100\mu A$	-0.5			V
Input On Voltage	Vi(on)	$V_{CE} = -0.3V$, $I_{C} = -10mA$			-3	V
Input Resistor	R ₁		32	47	62	KΩ
Resistor Ratio	R_1/R_2		0.9	1	1.1	







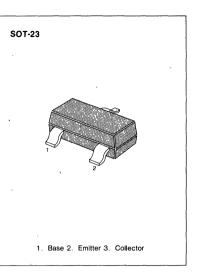




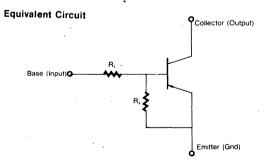
- Switching Circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor (R₁=4.7KΩ, R₂=10KΩ)
- Complement to KSR1105

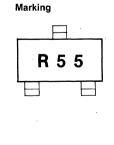
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

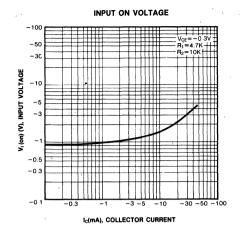
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Junction Temperature Storage Temperature	V _{CBO} V _{CEO} V _{EBO} I _C P _C Tj	-50 -50 -10 -100 200 150 -55~150	V V V mA mW °C

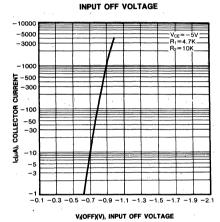


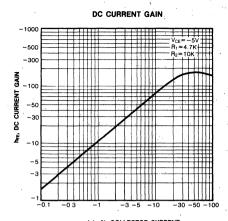
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = -10\mu A, I_{E} = 0$	-50			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -100 \mu A, I_{B} = 0$	-50			V
Collector Cutoff Current	I _{CBO}	$V_{CB} = -40V, I_{E} = 0$			-0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = -5V$, $I_C = -5mA$	30			-
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -10 \text{mA}, I_{B} = -0.5 \text{mA}$			-0.3	V 1
Current Gain-Bandwidth Product	Cob	$V_{CB} = -10V, I_{E} = 0$ f=1MHz		5.5		pF
Current Gain-Bandwidth Product	f _T	$V_{CE} = -10V, I_{C} = -5mA$		200		MHz
Input Off Voltage	Vi(off)	$V_{CE} = -5V$, $I_{C} = -100\mu A$	-0.3			V
Input On Voltage	Vi(on)	$V_{CE} = -0.3V$, $I_{C} = -20mA$			-2.5	V
Input Resistor	R ₁		3.2	4.7	6.2	KΩ
Resistor Ratio	R_1/R_2		0.42	0.47	0.52	

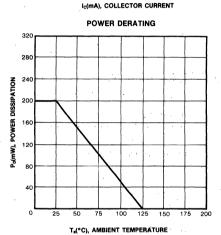








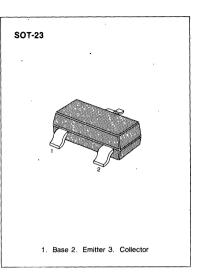




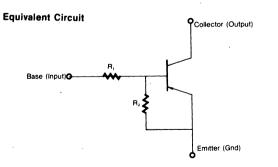
- Switching Circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor (R₁=10KΩ, R₂=47KΩ)
- Complement to KSR1106

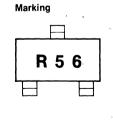
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

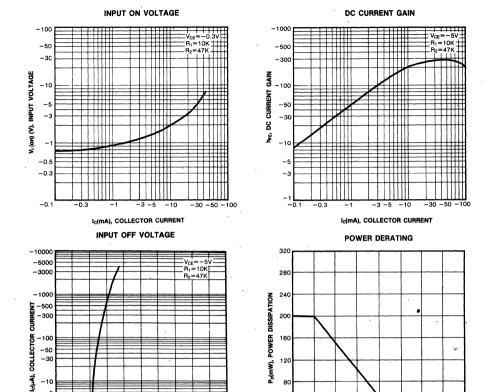
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-50	V
Collector-Emitter Voltage	V _{CEO}	-50	,V
Emitter-Base Voltage	V_{EBO}	-10	V
Collector Current	l _C	-100	mA
Collector Dissipation	Pc	200	mW
Junction Temperature	Ti	150	°C
Storage Temperature	Tstg	−55∼150	°C



Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =-10μA, I _E =0	-50·			v
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -100 \mu A, I_{B} = 0$	-50			V
Collector Cutoff Current	I _{CBO}	$V_{CB} = -40V, I_{E} = 0$	<i>'</i>		-0:1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = -5V, I_{C} = -5mA$	68			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -10 \text{mA}, I_{B} = -0.5 \text{mA}$			-0.3	V
Output Capacitance	Cob	V _{CB} =-10V, I _E =0 f=1.MHz		5.5		pF
Current Gain-Bandwidth Product	f _T	$V_{CE} = -10V, I_{C} = -5mA$. 200		MHz
Input Off Voltage	Vi(off)	$V_{CE} = -5V$, $I_{C} = -100\mu A$	-0.3			V
Input On Voltage	Vi(on)	$V_{CE} = -0.3V$, $I_{C} = -1 \text{ mA}$			-1.4	V
Input Resistor	R ₁		7	.10	13	ΚΩ
Resistor Ratio	R ₁ /R ₂		0.19	0.21	0.24	







80 40

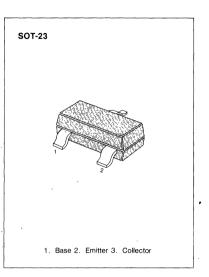
o'

-10

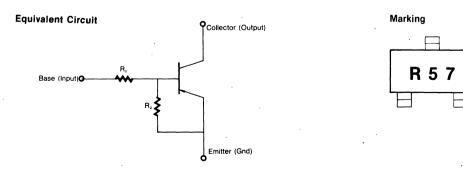
- Switching Circuit, Inverter, Interface circuit
 Driver circuit
- Built in bias Resistor ($R_1 = 22K\Omega$, $R_2 = 47K\Omega$)
- Complement to KSR1107

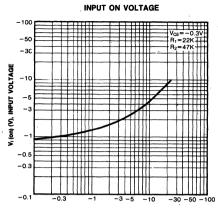
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

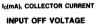
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage	V _{CBO} V _{CEO} V _{EBO}	-50 -50 -10	V V
Collector Current Collector Dissipation Junction Temperature Storage Temperature	I _C P _C Tj Tstg	-100 200 150 -55~150	mA mW °C °C

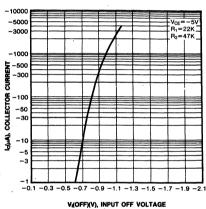


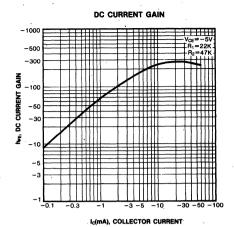
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = -10\mu A, I_{E} = 0$	-50			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -100 \mu A, I_{B} = 0$	-50			V
Collector Cutoff Current	I _{CBO}	$V_{CB} = -40V, I_E = 0$			-0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = -5V$, $I_C = -5mA$	68			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{c} = -10 \text{mA}, I_{B} = -0.5 \text{mA}$			-0.3	\ \ \ \ \
Current Gain-Bandwidth Product	Cob	$V_{CB} = -10V, I_{E} = 0$ f = 1MHz		5.5		pF
Current Gain-Bandwidth Product	f _T	$V_{CE} = -10V, I_{C} = -5mA$		200		MHz
Input Off Voltage	Vi(off)	$V_{CE} = -5V$, $I_{C} = -100\mu A$	-0.4			v
Input On Voltage	Vi(on)	$V_{CE} = -0.3V$, $I_{C} = -2mA$			-2.5	V
Input Resistor	R ₁		15	22	29	ΚΩ
Resistor Ratio	R ₁ /R ₂		0.42	0.47	. 0.52	

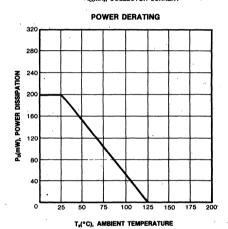








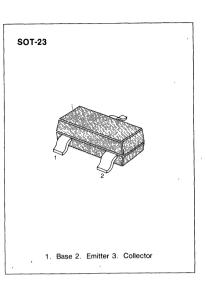




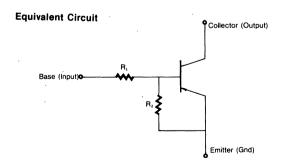
- Switching Circuit, Inverter, Interface circuit
 Driver circuit
- Built in bias Resistor (R₁=47KΩ, R₂=22KΩ)
- Complement to KSR1108

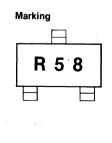
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

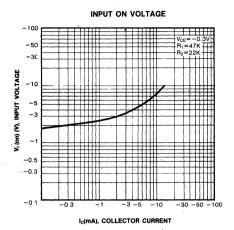
Characteristic	Symbol	Rating	Unit	
Collector-Base Voltage	V _{CBO}	-50	٧	
Collector-Emitter Voltage	V _{CEO}	-50	٧	
Emitter-Base Voltage	V _{EBO}	-10	V	
Collector Current	l _c	-100	mA	
Collector Dissipation	Pc	200	mW	
Junction Temperature	Tj	150	°C	
Storage Temperature	Tstg	−55 ~ 150	°C	

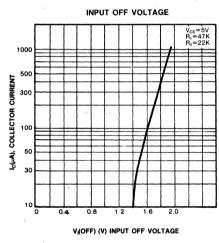


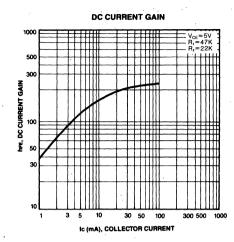
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = -10\mu A, I_{E} = 0$	-50			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -100 \mu A, I_{B} = 0$	-50			V
Collector Cutoff Current	I _{CBO}	V _{CB} =-40V, I _E =0			-0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = -5V$, $I_C = -5mA$	56			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -10 \text{mA}, I_{B} = -0.5 \text{mA}$			-0.3	V
Current Gain-Bandwidth Product	f _T	$V_{CE} = -5mA$, $I_{C} = -10V$		200		MHz
Output Capacitance	Cob	V _{CB} =-10V, I _E =0 f=1.0MHz		5.5		pF
Input Off Voltage	Vi(off)	$V_{CE} = -5V$, $I_{C} = -100 \mu A$	-0.8			٧
Input On Voltage	Vi(on)	$V_{CE} = -0.3V$, $I_{C} = -2mA$			-4	V
Input Resistor	R ₁		32	47	62	ΚΩ
Resistor Ratio	R ₁ /R ₂		1.9	2.1	2.4	

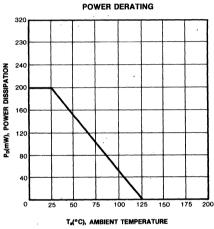








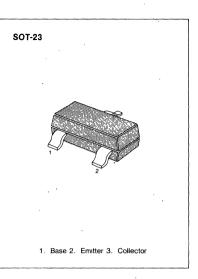




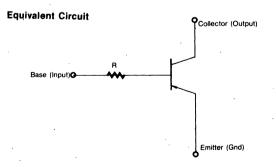
- Switching Circuit, Inverter, Interface circuit
 Driver circuit
- Built in bias Resistor (R=4.7K Ω)
- Complement to KSR1109

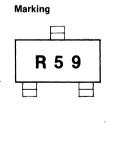
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

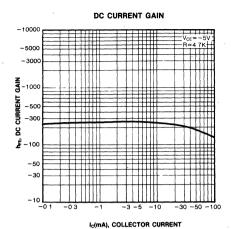
Characteristic	Symbol	Rating	Unit	
Collector-Base Voltage	V _{CBO}	-40	V	
Collector-Emitter Voltage	V _{CEO}	-40	V	
Emitter-Base Voltage	V _{EBO}	-5	V	
Collector Current	l _G	-100	mA	
Collector Dissipation	Pc	200	mW	
Junction Temperature	. Tj	150	°C	
Storage Temperature	Tstg	−55 ~ 150	°C	

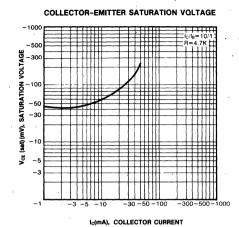


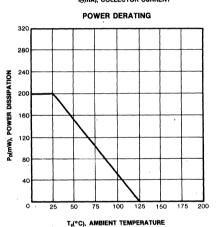
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =-100μA, I _E =0	-40			>
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C = -1 \text{ mA}, I_B = 0$	-40			V
Collector Cutoff Current	I _{CBO}	V _{CB} =-30V, I _E =0	ì		-0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = -5V$, $I_C = -1mA$	100		600	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =-10mA, I _B =-1mA			-0.3	V
Output Capacitance	Cob	$V_{CB} = -10V, I_{E} = 0$ f = 1MHz		5.5		pF
Current Gain-Bandwidth Product	f _T	V _{CE} =-10V, I _C =-5mA		200		MHz
Input Resistor	R₁		3.2	4.7	6.2	KΩ









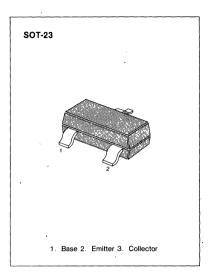


SAMSUNG SEMICONDUCTOR

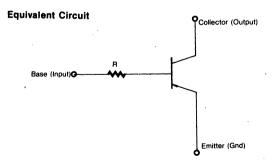
- Switching Circuit, Inverter, Interface circuit
 Driver circuit
- Built in bias Resistor (R=10KΩ)
- Complement to KSR1110

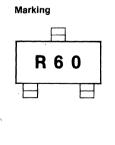
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	bol Rating	
Collector-Base Voltage	V _{CBO}	-40	٧
Collector-Emitter Voltage	V _{CEO}	-40	V
Emitter-Base Voltage	V _{EBO}	-5	V
Collector Current	l _C	-100	mA
Collector Dissipation	Pc	200	mW
Junction Temperature	Tj .	150	°C
Storage Temperature	Tstg	−55∼150	°C



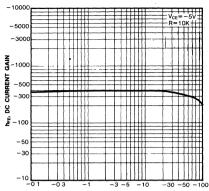
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =-100μA, I _E =0	-40			v
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _E =-1mA, I _B =0	-40	:	\$	v
Collector Cutoff Current	Ісво	$V_{CB} = -30V, I_E = 0$			-0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = -5V$, $I_{C} = -1mA$	100		600	j .
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -10 \text{mA}, I_{B} = -1 \text{mA}$		i.	0.3	v
Output Capacitance	Cob	$V_{CB} = -10V, I_{E} = 0$ f=1MHz		5.5		pF
Current Gain-Bandwidth Product Input Resistor	f _⊤ R	V _{CE} =-10V, I _C =-5mA	7	200 10	13	MHz ·



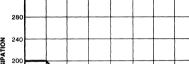


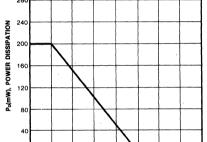
320





Ic(mA), COLLECTOR CURRENT **POWER DERATING**

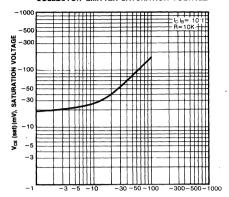




T_a(°C), AMBIENT TEMPERATURE

175 150

COLLECTOR-EMITTER SATURATION VOLTAGE

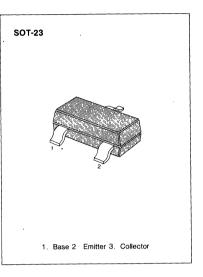


Ic(mA), COLLECTOR CURRENT

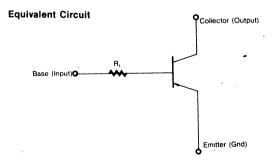
- Switching Circuit, Inverter, Interface circuit
 Driver circuit
- Built in bias Resistor (R=22KΩ)
- Complement to KSR1111

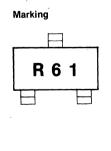
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Junction Temperature Storage Temperature	V _{CBO} V _{CEO} V _{EBO} I _C P _C Tj Tstq	-40 -40 -5 -100 200 150 -55~150	V V WA mW °C °C



Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =-100μA, I _E =0	-40			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _E =-1mA, I _B =0	-40			v
Collector Cutoff Current	I _{CBO}	V _{CB} =-30V, I _E =0			-0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = -5V$, $I_{C} = -1 \text{ mA}$	100		600	·
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =-10mA, I _B =-1mA	ļ		-0.3	V
Output Capacitance	Cob	$V_{CB} = -10V, I_E = 0$ f=1MHz		5.5		pF
Current Gain-Bandwidth Product	f _T	V _{CE} =-10V, I _C =-5mA		200		MHz
Input Resistor	R		15	22	29	KΩ

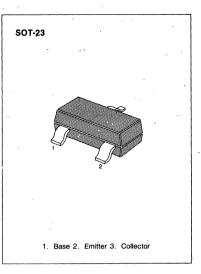




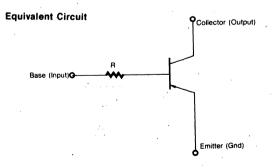
- Switching Circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor (R=47KΩ)
- Complement to KSR1112

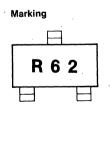
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-40	٧
Collector-Emitter Voltage	V _{CEO}	-40	V
Emitter-Base Voltage	V _{EBO}	-5	V
Collector Current	lc	-100	mA
Collector Dissipation	Pc	200	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55 ~ 150	°C



Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =-100μA, I _E =0	-40			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -1 \text{ mA}, I_{B} = 0$	-40			V
Collector Cutoff Current	I _{CBO}	$V_{CB} = -30V, I_E = 0$			-0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = -5V$, $I_C = -1mA$	100		600	·
Collector Emitter Saturation Voltage	V _{CE} (sat)	I _C =-10mA, I _B =-1mA			-0.3	٧
Output Capacitance	Cob	$V_{CB} = -10V, I_{E} = 0$ f=1MHz	,	5.5		pF
Current Gain Bandwidth Product	f _T	$V_{CE} = -10V, I_{C} = -5mA,$		200		MHz
Input Resistor	R	, ,	32	´ 47	62	ΚΩ

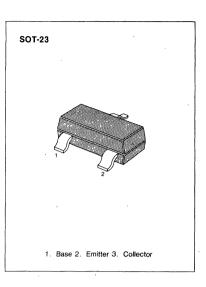




- Switching circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor (R₁=2.2KΩ, R₂=47KΩ)
- Complement to KSR1113

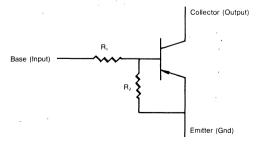
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

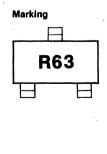
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-50	٧
Collector-Emitter Voltage	V _{CEO}	-50	V
Emitter-Base Voltage	V_{EBO}	· -10	V
Collector Current	Ic	-100	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55∼150	°C ·



Characteristic	Symbol	Test Condition	Min.	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = -10\mu A, I_{E} = 0$	-50			v
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -100 \mu A, I_{B} = 0$	-50			٧
Collector Cutoff Current	I _{CBO}	$V_{CB} = -40V, I_{E} = 0$			-0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = -5V$, $I_{C} = -5mA$	68			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -10 \text{mA}, I_{B} = -0.5 \text{mA}$			-0.3	V .
Current Gain-Bandwidth Product	f _T .	$V_{CE} = -5 \text{mA}, I_{C} = -10 \text{V}$		200		MHz
Output Capacitance	Cob	$V_{CB} = -10V, I_{E} = 0$		5.5		pF
·		f=1.0MHz			,	
Input Off Voltage	Vi(off)	$V_{CE} = -5V$, $I_{C} = -100\mu A$	-0.5			· V
Input On Voltage	Vi(on)	$V_{CE} = -0.2V$, $I_{C} = -10mA$	-		-1.1	٧
Input Resistor	R ₁		1.5	2.2	2.9	ΚΩ
Resistor Ratio	R ₁ /R ₂		0.042	0.047	0.052	



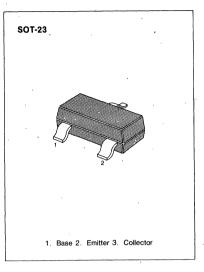




- Switching circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor ($R_1 = 4.7 K\Omega$, $R_2 = 47 K\Omega$)
- Complement to KSR1114

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

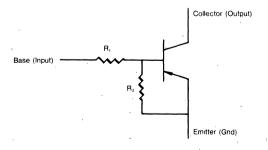
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Junction Temperature	V _{CBO} , V _{CEO} V _{EBO} I _C P _C Tj.	-50 -50 -10 -100 300 150	V V MA mW °C
Storage Temperature	Tstg	-55~150	, °C



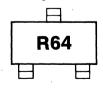
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =-10μA, I _E =0	-50			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -100 \mu A, I_{B} = 0$	-50			V
Collector Cutoff Current	I _{CBO}	$V_{CB} = -40V, I_{E} = 0$			− 0.1	μA
DC Current Gain	h _{FE}	$V_{CE} = -5V$, $I_C = -5mA$	68			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -10 \text{mA}, I_{B} = -0.5 \text{mA}$			-0.3	V
Current Gain-Bandwidth Product	f⊤	$V_{CE} = -5 \text{mA}, I_{C} = -10 \text{V}$		200		MHz
Output Capacitance	Cob	V _{CB} =-10V, I _E =0 f=1.0MHz		5.5		pF
Input Off Voltage	Vi(off)	$V_{CE} = -5V$, $I_{C} = -100\mu A$	-0.5			v
Input On Voltage	Vi(on)	$V_{CE} = -0.2V$, $I_{C} = -5mA$,	-1.3	V.
Input Resistor	R ₁		3.2	4.7	6.2	KΩ
Resistor Ratio	R ₁ /R ₂	-	0.09	0.1	0.11	

Equivalent Circuit



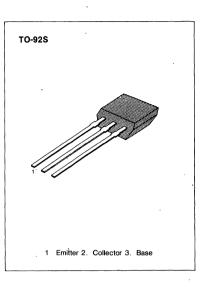
Marking



- Switching circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor (R₁=4.7KΩ, R₂=4.7KΩ)
- Complement to KSR1201

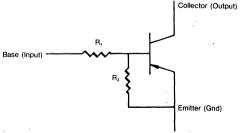
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

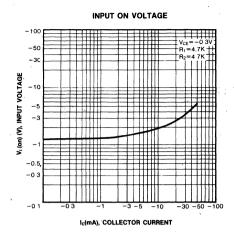
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Junction Temperature Storage Temperature	V _{CBO} V _{CEO} V _{EBO} I _C P _C Tj Tstg	-50 -50 -10 -100 300 150 -55~150	V V V mA mW °C

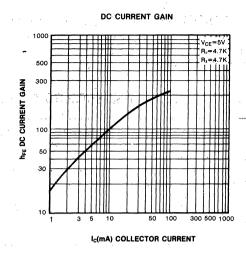


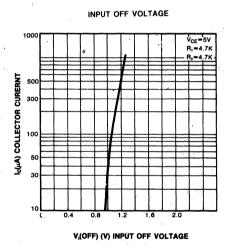
ELECTRICAL CHARACTERISTICS (Ta=25°C)

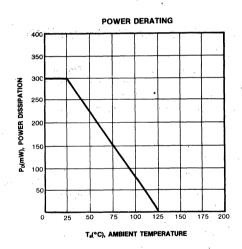
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CEO}	I _C =-10μA, I _E =0	-50			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -100 \mu A, I_{B} = 0$	-50			V
Collector Cutoff Current	I _{CBO}	$V_{CB} = -40V, I_{E} = 0$			-0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = -5V, I_{C} = -10mA$	20		· ·	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -10 \text{mA}, I_{B} = -0.5 \text{mA}$			-0.3	٧
Current Gain-Bandwidth Product	f _T	$V_{CE} = -5 \text{mA}, I_{C} = -10 \text{V}$		200		MHz
Output Capacitance	Cob	V _{CB} =-10V, I _E =0 f=1.0MHz		5.5		рF
Input Off Voltage	Vi(off)	$V_{CE} = -5V$, $I_{C} = -100\mu A$	-0.5	'		. V
Input On Voltage	Vi(on)	$V_{CE} = -0.3V$, $I_{C} = -20mA$			-3	V .
Input Resistor	R ₁		3.2	4.7	6.2	KΩ
Resistor Ratio	R ₁ /R ₂		0.9	1	1.1	







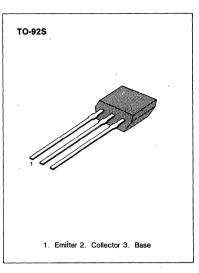




- Switching circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor($R_1 = 10K\Omega$, $R_2 = 10K\Omega$)
- Complement to KSR1202

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

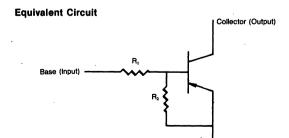
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-50	٧
Collector-Emitter Voltage	V _{CEO}	-50	V
Emitter-Base Voltage	V _{EBO}	-10	. V
Collector Current	l _C	-100	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55 ~ 150	°C

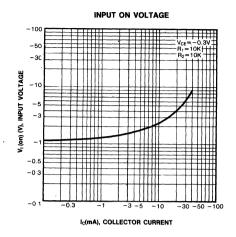


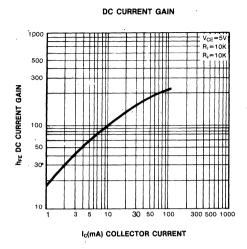
ELECTRICAL CHARACTERISTICS (Ta=25°C)

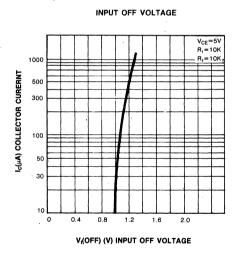
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =-10μA, I _E =0	-50			v
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -100 \mu A, I_{B} = 0$	-50			٧
Collector Cutoff Current	Ісво	$V_{CB} = -40V, I_E = 0$			-0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE}=-5V$, $I_{C}=-5mA$	30			-
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -10 \text{mA}, I_{B} = -0.5 \text{mA}$			-0.3	٧
Current Gain-Bandwidth Product	f _T	V _{CE} =-5mA, I _C =-10V		200		MHz
Output Capacitance	Cob	V _{CB} =-10V, I _E =0		5.5	·	pF
		f=1.0MHz				
Input Off Voltage	Vi(off)	$V_{CE} = -5V, I_{C} = -100 \mu A$	-0.5			٧
Input On Voltage	Vi(on)	$V_{CE} = -0.3V, I_{C} = -10mA$			-3	٧
Input Resistor	R ₁		7	10	13	ΚΩ
Resistor Ratio	R ₁ /R ₂		0.9	1	1.1	

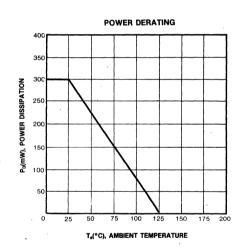
Emitter (Gnd)







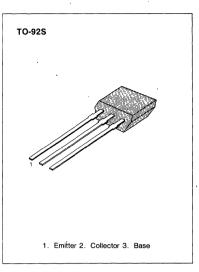




- Switching circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor($R_1 = 22K\Omega$, $R_2 = 22K\Omega$)
- Complement to KSR1203

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

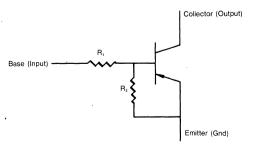
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation	V _{CBO} V _{CEO} V _{EBO} I _C P _C	-50 -50 -10 -100 300 150	V V MA mW
Junction Temperature Storage Temperature	Tj Tstg	-55~150	°C

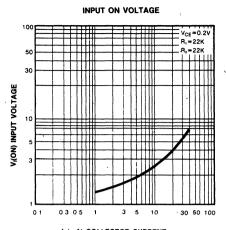


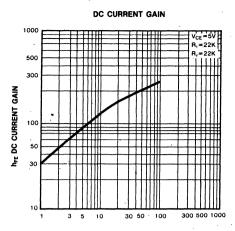
ELECTRICAL CHARACTERISTICS (Ta=25°C)

6

Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =-10μA, I _E =0	-50			٧
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -100 \mu A, I_{B} = 0$	-50			٧
Collector Cutoff Current	СВО	V _{CB} =-40V, I _E =0			-0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = -5V, I_{C} = -5mA$	56			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -10 \text{mA}, I_{B} = -0.5 \text{mA}$			-0.3	٧
Current Gain-Bandwidth Product	f _T	$V_{CE} = -5 \text{mA}, I_{C} = -10 \text{V}$		200		MHz
Output Capacitance	Cob	$V_{CB} = -10V, I_{E} = 0$		5.5		pF
		f=1.0MHz	,			
Input Off Voltage	Vi(off)	$V_{CE} = -5V$, $I_{C} = -100 \mu A$	-0.5			٧
Input On Voltage	Vi(on)	$V_{CE} = -0.2V$, $I_{C} = -5mA$			-3.0	٧
Input Resistor	R ₁		15	22	29	KΩ
Resistor Ratio	R ₁ /R ₂	,	0.9	1	1.1	

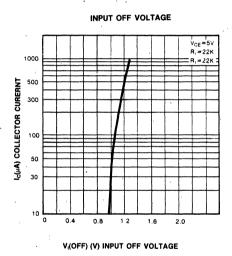


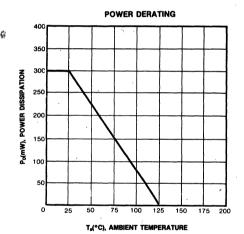




I_C(mA) COLLECTOR CURRENT



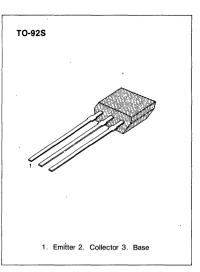




- Switching circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor (R₁=47KΩ, R₂=47KΩ)
- Complement to KSR1204

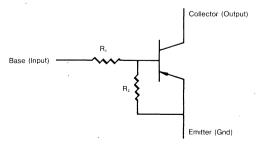
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

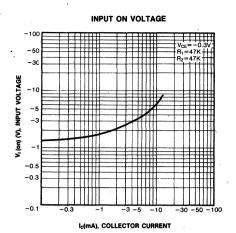
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-50	٠٧
Collector-Emitter Voltage	V _{CEO}	-50	,V
Emitter-Base Voltage	V _{EBO}	-10	V
Collector Current	lc '	-100	mΑ
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55 ~ 150	°C

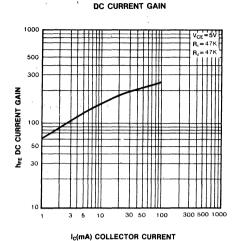


ELECTRICAL CHARACTERISTICS (Ta=25°C)

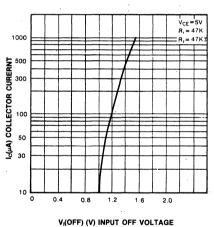
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = -10\mu A, I_{E} = 0$	-50			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -100 \mu A, I_{B} = 0$	-50			V
Collector Cutoff Current	I _{CBO}	$V_{CB} = -40V, I_{E} = 0$			-0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = -5V, I_{C} = -5mA$	68		1	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -10 \text{mA}, I_{B} = -0.5 \text{mA}$			-0.3	٧
Current Gain-Bandwidth Product	f _T	$V_{CE} = -5 \text{mA}, I_{C} = -10 \text{V}$		200		MHz
Output Capacitance	Cob	V _{CB} =-10V, I _E =0 f=1.0MHz		5.5		рF
Input Off Voltage	Vi(off)	$V_{CE} = -5V, I_{C} = -100 \mu A$	-0.5			V
Input On Voltage	Vi(on)	$V_{CE} = -0.3V$, $I_{C} = -10mA$			-3	V
Input Resistor	R ₁		32	47	62	KΩ
Resistor Ratio	R ₁ /R ₂		0.9	. 1	1.1	

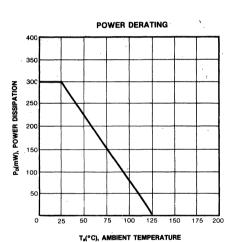








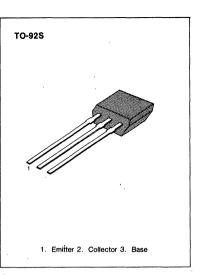




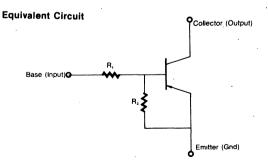
- Switching Circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor ($R_1 = 4.7 \text{K}\Omega$, $R_2 = 10 \text{K}\Omega$)
- Complement to KSR1205

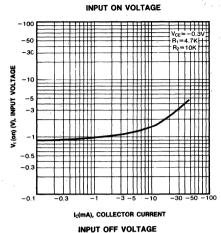
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

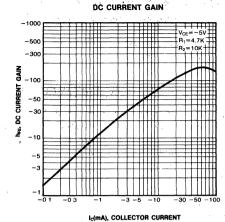
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-50	٧
Collector-Emitter Voltage	V _{CEO}	-50	V
Emitter-Base Voltage	V _{EBO}	-10	V
Collector Current	l _c	-100	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55 ~ 150	°C

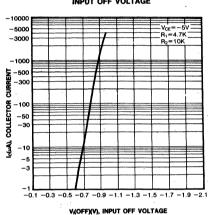


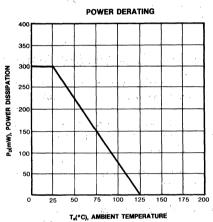
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =-10μA, I _E =0	-50			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =-100µA, I _B =0	-50			V
Collector Cutoff Current .	I _{CBO}	$V_{CB} = -40V, I_E = 0$			-0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = -5V, I_{C} = -5mA$	30		ĺ	•
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -10 \text{mA}, I_{B} = -0.5 \text{mA}$			-0.3	V
Current Gain-Bandwidth Product	Cob	$V_{CB} = -10V, I_E = 0$ f = 1 MHz		5.5		pF
Current Gain-Bandwidth Product	f _T	V _{CE} =-10V, I _C =-5mA		200		MHz
Input Off Voltage	Vi(off)	$V_{CE} = -5V$, $I_{C} = -100 \mu A$	-0.3			V
Input On Voltage	Vi(on)	$V_{CE} = -0.3V$, $I_{C} = -20mA$			-2.5	٧
Input Resistor	R ₁		3.2	4.7	6.2	KΩ
Resistor Ratio	R ₁ /R ₂		0.42	0.47	0.52	
•	I	1	l	I	1	







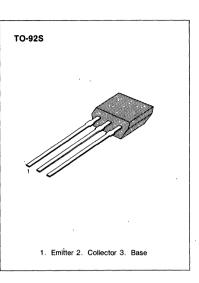




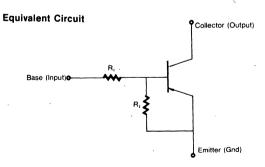
- Switching Circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor (R₁=10K Ω , R₂=47K Ω)
- Complement to KSR1206

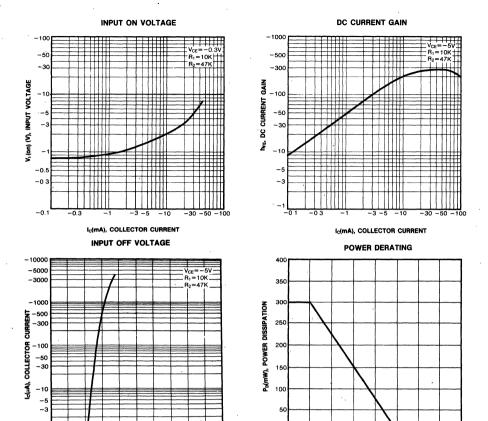
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-50	٧
Collector-Emitter Voltage	V _{CEO}	-50	V
Emitter-Base Voltage	V _{EBO}	-10	V
Collector Current	l _C	-100	mΑ
Collector Dissipation	Pc	. 300	mW
Junction Temperature	Ti	150	°C
Storage Temperature	Tstg	−55 ~ 150	°C



Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{c} = -10\mu A, I_{E} = 0$	-50			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -100 \mu A, I_{B} = 0$	-50			V
Collector Cutoff Current	I _{CBO}	$V_{CB} = -40V, I_{E} = 0$			-0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = -5V, I_{C} = -5mA$	68			,
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{c} = -10 \text{mA}, I_{B} = -0.5 \text{mA}$			-0.3	V
Output Capacitance	Cob	$V_{CB} = -10V, I_{E} = 0$		5.5		pF
		f=1MHz				
Current Gain-Bandwidth Product	f⊤	$V_{CE} = -10V, I_{C} = -5mA$		200		MHz
Input Off Voltage	Vi(off)	$V_{CE} = -5V$, $I_{C} = -100\mu A$	-0.3			V
Input On Voltage	Vi(on)	$V_{CE} = -0.3V$, $I_{C} = -1 \text{ mA}$			-1.4	V
Input Resistor	R₁	,	7	10	13	ΚΩ
Resistor Ratio	R_1/R_2	·	0.19	0.21	0.24	





. 25

T_s(°C), AMBIENT TEMPERATURE

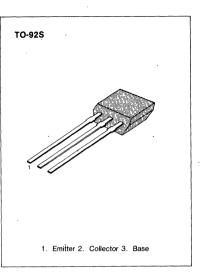
-0.1 -0.3 -0.5 -0.7 -0.9 -1.1 -1.3 -1.5 -1.7 -1.9 -2.1

V(OFF)(V), INPUT OFF VOLTAGE

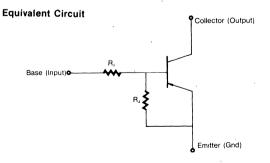
- Switching Circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor ($R_1 = 22K \Omega R_2 = 47K \Omega$)
- Complement to KSR1207

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

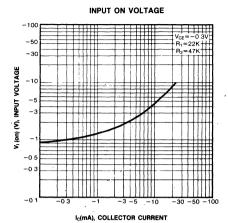
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-50	۸,
Collector-Emitter Voltage	V _{CEO}	-50	· V
Emitter-Base Voltage	V_{EBO}	-10	V
Collector Current	lc	-100	mΑ
Collector Dissipation	Pc	300	mW
Junction Temperature	Ti	150	°C
Storage Temperature	Tstg	-55∼150	°C

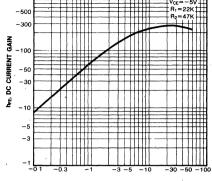


Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =-10μA, I _E =0	-50			٧
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -100 \mu A, I_{B} = 0$	-50			٧
Collector Cutoff Current	I _{CBO}	$V_{CB} = -40V, I_{E} = 0$			-0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = -5V$, $I_{C} = -5mA$	68	,		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -10 \text{mA}, I_{B} = -0.5 \text{mA}$			-0.3	· V
Current Gain-Bandwidth Product	Cob	$V_{CB} = -10V, I_{E} = 0$ f = 1 MHz		5.5	. !	pF
Current Gain-Bandwidth Product	f⊤	$V_{CE} = -10V, I_{C} = -5mA$		200		MHz
Input Off Voltage	Vi(off)	$V_{CE} = -5V$, $I_{C} = -100\mu A$	-0.4			٧
Input On Voltage	Vi(on)	$V_{CE} = -0.3V$, $I_{C} = -2mA$			-2.5	V
Input Resistor	R ₁		15	22	29	ΚΩ
Resistor Ratio	R ₁ /R ₂		0.42	0.47	0.52	



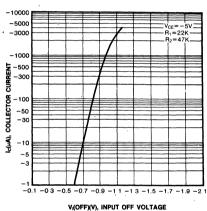
-1000



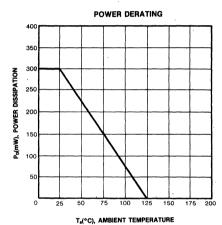


DC CURRENT GAIN





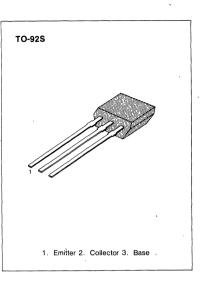




- Switching circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor (R₁=47KΩ, R₂=22KΩ)
- Complement to KSR1208

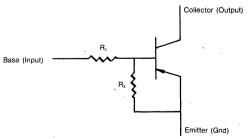
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

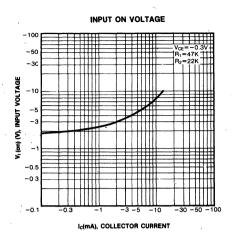
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	٧
Collector-Emitter Voltage	V _{CEO}	-50	Ý
Emitter-Base Voltage	V _{EBO}	-10	V
Collector Current	I _C	-100	mA
Collector Dissipation	Pc	300	m₩
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55 ~ 150	°C

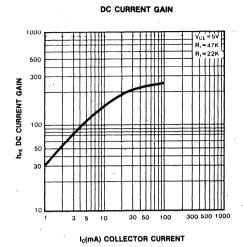


ELECTRICAL CHARACTERISTICS (Ta=25°C)

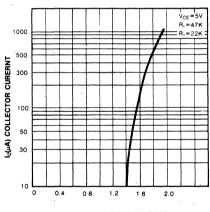
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =-10μA, I _E =0	-50			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -100 \mu A, I_{B} = 0$	-50			٧
Collector Cutoff Current	I _{CBO}	$V_{CB} = -40V, I_E = 0$			-0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = -5V$, $I_C = -5mA$	56			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -10 \text{mA}, I_{B} = -0.5 \text{mA}$			-0.3	V
Current Gain-Bandwidth Product	f _T	$V_{CE} = -5 \text{mA}, I_{C} = -10 \text{V}$		200		MHz
Output Capacitance	Cob	$V_{CB} = -10V, I_{E} = 0$ f=1.0MHz		5.5		pF
Input Off Voltage	Vi(off)	$V_{CE} = -5V$, $I_{C} = -100\mu A$	-0.8			٧
Input On Voltage	Vi(on)	$V_{CE} = -0.3V$, $I_{C} = -2mA$			-4	V
Input Resistor	R_1		32	47	62	KΩ
Resistor Ratio	R ₁ /R ₂		1.9	2.1	2.4	

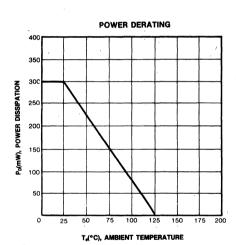








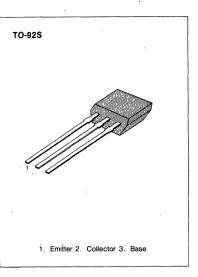




- Switching Circuit, Inverter, Interface circuit
 Driver circuit
- Built in bias Resistor (R=4.7KΩ)
- Complement to KSR1209

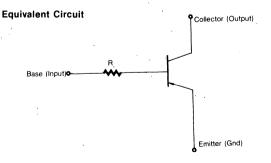
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

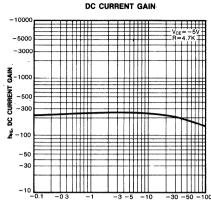
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-40	٧
Collector-Emitter Voltage	V _{CEO} ·	-40	٧
Emitter-Base Voltage	V _{EBO}	-5	V
Collector Current	l _c	-100	mΑ
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55 ~ 150	°C



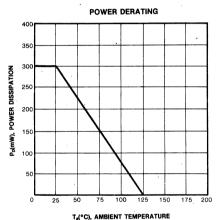
ELECTRICAL CHARACTERISTICS (T_a=25°C)

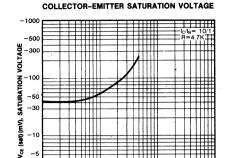
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =-100μA, I _E =0	-40			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -1 \text{ mA}, I_{B} = 0$	-40			v
Collector Cutoff Current	I _{CBO}	$V_{CB} = -30V, I_{E} = 0$			-0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =-5V, I _C =-1mA	100		600	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =-10mA, I _B =-1mA			-0.3	V
Output Capacitance	Cob	$V_{CB} = -10V, I_{E} = 0$ f = 1MHz		5.5		рF
Current Gain-Bandwidth Product	f⊤	$V_{CE} = -10V, I_{C} = -5mA$		200		MHz
Input Resistor	R ₁		3.2	4.7	6.2	KΩ









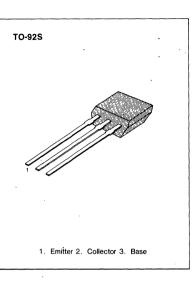


Ic(mA), COLLECTOR CURRENT

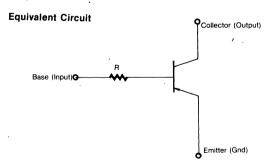
- Switching Circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor (R=10KΩ)
- Complement to KSR1210

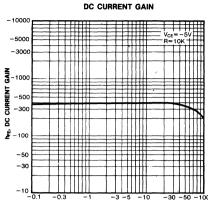
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-40	V
Collector-Emitter Voltage	V _{CEO}	-40	V
Emitter-Base Voltage	V _{EBO}	-5	V
Collector Current	Ic	-100	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55∼150	°C

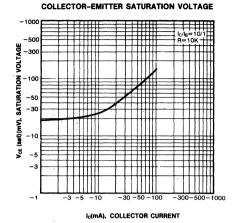


Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =-100μA, I _E =0	-40			٧.
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{\rm E} = -1 \rm mA, \ I_{\rm B} = 0$	-40			V
Collector Cutoff Current	I _{CBO}	V _{CB} =-30V, I _E =0			-0.1	μĄ
DC Current Gain	h _{FE}	$V_{CE} = -5V$, $I_{C} = -1mA$	100		600	•
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -10 \text{mA}, I_{B} = -1 \text{mA}$			0.3	٧
Output Capacitance	Cob	$V_{CB} = -10V, I_{E} = 0$ f=1MHz		5.5		pF
Current Gain-Bandwidth Product	f _T	V _{CE} =-10V, I _C =-5mA		200		MHz
Input Resistor	R		7	10	13	KΩ

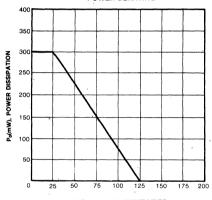










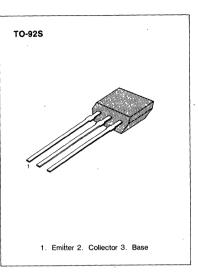


 $T_a(^{\circ}C)$, AMBIENT TEMPERATURE

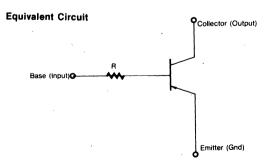
- Switching Circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor (R=22KΩ)
- Complement to KSR1211

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-40	V
Collector-Emitter Voltage	V _{CEO}	-40	V
Emitter-Base Voltage	V _{EBO}	· -5	. V
Collector Current	l _C	, -100	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	· Tj	150	°C
Storage Temperature	Tstg	−55 ~ 150	°C



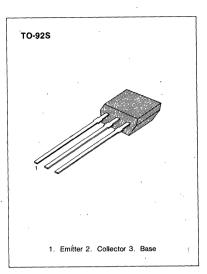
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = -100 \mu A, I_{E} = 0$	-40			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _E =-1mA, I _B =0	-40		ļ	V
Collector Cutoff Current	Ісво	$V_{CB} = -30V, I_E = 0$			-0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =-5V, I _C =-1mA	100		600	,
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =-10mA, I _B =-1mA			-0.3	V
Output Capacitance	Cob	$V_{CB} = -10V, I_{E} = 0$ f = 1 MHz		5.5		· pF
Current Gain-Bandwidth Product	f⊤	V _{CE} =-10V, I _C =-5mA	j	200		MHz
Input Resistor	R		15	22	29	KΩ



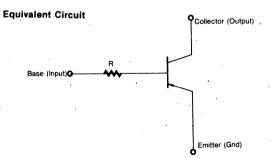
- Switching Circuit, Inverter, Interface circuit
 Driver circuit
- Built in bias Resistor (R=47KΩ)
- Complement to KSR1212

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-40	٧
Collector-Emitter Voltage	V _{CEO}	-40	٧.
Emitter-Base Voltage	V _{EBO}	-5	٧
Collector Current	lc	-100	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj .	150	°C
Storage Temperature	Tstg	-55~150	°C



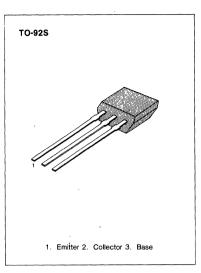
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =-100μA, I _E =0	-40	!		V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C = -1 \text{ mA}, I_B = 0$	-40			V
Collector Cutoff Current	I _{CBO}	V _{CB} =-30V, I _E =0			-0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE}=-5V$, $I_{C}=-1$ mA	100		600	·
Collector Emitter Saturation Voltage	V _{CE} (sat)	I _C =-10mA, I _B =-1mA	}		-0.3	V
Output Capacitance	Cob	$V_{CB} = -10V, I_{E} = 0$ f = 1MHz	,	5.5	,	pF _.
Current Gain Bandwidth Product	fτ	V _{CE} =-10V, I _C =-5mA,	1	200		MHz
Input Resistor	R		32	47	62	KΩ



- Switching circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor ($R_1 = 2.2K\Omega$, $R_2 = 47K\Omega$)
- Complement to KSR1213

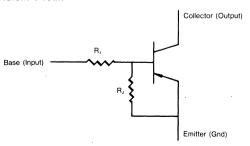
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-50	V
Collector-Emitter Voltage	· V _{CEO}	-50	V
Emitter-Base Voltage	V _{EBO}	-10	V
Collector Current	l _C	-100	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj	150	°Ç
Storage Temperature	Tstg	, -55 ~ 150	°C



ELECTRICAL CHARACTERISTICS (Ta=25°C)

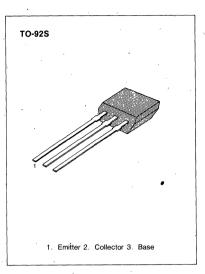
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = -10\mu A, I_{E} = 0$	-50			v
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -100 \mu A, I_{B} = 0$	-50			V
Collector Cutoff Current	I _{CBO}	$V_{CB} = -40V, I_E = 0$			-0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = -5V, I_{C} = -5mA$	68			·
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -10 \text{mA}, I_{B} = -0.5 \text{mA}$			-0.3	V
Current Gain-Bandwidth Product	f _T	V _{CE} =-5mA, I _C =-10V		200		MHz
Output Capacitance	Cob	$V_{CB} = -10V, I_{E} = 0$ f = 1.0MHz		5.5		pF
Input Off Voltage	Vi(off)	$V_{CE} = -5V$, $I_{C} = -100\mu A$	-0.5			V
Input On Voltage	Vi(on)	$V_{CE} = -0.2V$, $I_{C} = -10mA$		1	-1.1	V
Input Resistor	R ₁		1.5	2.2	2.9	KΩ
Resistor Ratio	R ₁ /R ₂		0.042	0.047	0.052	



- Switching circuit, Inverter, Interface circuit Driver circuit
- Built in bias Resistor ($R_1 = 4.7K\Omega$, $R_2 = 47K\Omega$)
- Complement to KSR1214

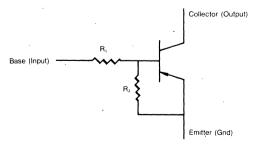
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-50	٧
Collector-Emitter Voltage	V _{CEO}	-50	V.
Emitter-Base Voltage	V_{EBO}	-10	V
Collector Current	l _C	-100	mA
Collector Dissipation	Pc	300	mW
Junction Temperature	Tj	150	· °C
Storage Temperature	Tstg	−55 ~ 150	°C



ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = -10\mu A, I_{E} = 0$	-50			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -100 \mu A, I_{B} = 0$	-50			V
Collector Cutoff Current	I _{CBO}	$V_{CB} = -40V, I_E = 0$,		-0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE} = -5V, I_{C} = -5mA$	68			
Collector-Emitter Saturation Voltage	·V _{CE} (sat)	$I_{C} = -10 \text{mA}, I_{B} = -0.5 \text{mA}$			-0.3	V
Current Gain-Bandwidth Product	f _T	$V_{CE} = -5 \text{mA}, I_{C} = -10 \text{V}$		200		MHz
Output Capacitance	Cob	$V_{CB} = -10V, I_E = 0$ f = 1.0MHz		5.5		pF
Input Off Voltage	Vi(off)	$V_{CE} = -5V$, $I_{C} = -100\mu A$	-0.5			V .
Input On Voltage	Vi(on)	$V_{CE} = -0.2V$, $I_{C} = -5mA$			-1.3	٧
Input Resistor	R ₁		3.2	4.7	6.2	KΩ
Resistor Ratio	R ₁ /R ₂		0.09	0.1	0.11	



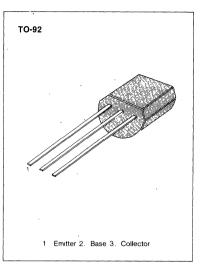
GENERAL PURPOSE TRANSISTOR

- Collector-Emitter Voltage: V_{CEO} = 40V
- Collector Dissipation: Pc (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage	V _{CBO}	60 40	· V
Emitter-Base Voltage	V _{EBO}	6	V
Collector Current Collector Dissipation	Ic Pc	200 625	mA mW
Junction Temperature Storage Temperature	T _{.j}	150 -55~150	•C

[•] Refer to 2N3904 for graphs



Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 10 \mu A, I_{E} = 0$	60			V
*Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C = 1mA$, $I_B = 0$	40			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	6			. A
Collector Cut-off Current	I _{CEX}	$V_{CE} = 30V, V_{EB} = 3V$			50	nA
Base Cut-off Current	IBL	$V_{CE} = 30V, V_{EB} = 3V$			-50	nA
*DC Current Gain	h _{FE}	$I_C = 0.1 \text{mA}, V_{CE} = 1 \text{V}$	20	•		
		I _C =1mA, V _{CE} =1V	35			
, .		$I_C = 10 \text{mA}, V_{CE} = 1 \text{V}$	50		150	
		$I_C = 50 \text{mA}, V_{CE} = 1V$	30		1	
		$I_{C} = 100 \text{mA}, V_{CE} = 1V$	15			
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = 10 \text{mA}, I_B = 1 \text{mA}$	1		0.2	V
		$I_C = 50mA$, $I_B = 5mA$			0.3	V
*Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_C = 10 \text{mA}, I_B = 1 \text{mA}$	0.65		0.85	V
		$I_C = 50 \text{mA}, I_B = 5 \text{mA}$			0.95	V
Output Capacitance	Cob	$V_{CB} = 5V, I_{E} = 0$			4	pF
,		f=1MHz				
Current Gain Bandwidth Product	f _T	I _C = 10mA, V _{CE} = 20V f=100MHz	250			MHz
Turn On Time	ton	$V_{CC} = 3V, V_{BE} = 0.5V$. 70	ns
		$I_C = 10 \text{mA}, I_{B1} = 1 \text{mA}$				
Turn Off Time	toff	$V_{CC} = 3V$, $I_C = 1mA$			225	ns
		$I_B = I_{B2} = 1mA$				

^{*} Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2%

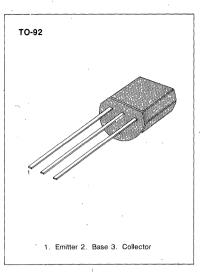
GENERAL PURPOSE TRANSISTOR

• Collector-Emitter Voltage: V_{CEO} = 40V

• Collector Dissipation: Pc (max)=625mW

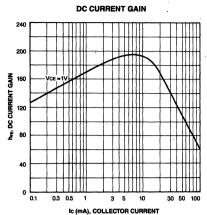
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	60	V
Collector-Emitter Voltage	V _{CEO}	40	٧
Emitter-Base Voltage	V _{EBO}	6	٧
Collector Current	Ic	200	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	Τj	150	°C
Storage Temperature	Tstg	-55∼150	°C

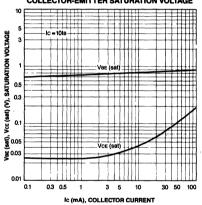


Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 10 \mu A, I_{E} = 0$	60			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 1 \text{mA}, I_{B} = 0$	40			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_{\rm E} = 10 \mu A$, $I_{\rm C} = 0$	6			V
Collector Cut-off Current	I _{CEX}	V _{CE} =30V, V _{EB} =3V			50	nA
Base Cut-off Current	I _{BL}	V _{CE} =30V, V _{EB} =3V			50	nA
*DC Current Gain h	h _{FE}	$I_C = 0.1 \text{mA}, V_{CE} = 1 \text{V}$	40			
	,	$I_C = 1 \text{mA}, V_{CE} = 1 \text{V}$	70			
		$I_C = 10 \text{mA}, V_{CE} = 1 \text{V}$	100		300	
		$I_C = 50 \text{mA}, V_{CE} = 1V$	60			
	{	$I_{C} = 100 \text{mA}, V_{CE} = 1V$	30			
*Collector-Èmitter Saturation Voltage	V _{CE} (sat)	$I_C = 10mA$, $I_B = 1mA$			0.2	V.
	Í	$I_C = 50 \text{mA}, I_B = 5 \text{mA}$			0.3	V
*Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_C = 10 \text{mA}, I_B = 1 \text{mA}$	0.65		0.85	V
	1	$I_C = 50 \text{mA}$, $I_B = 5 \text{mA}$			0.95	V
Output Capacitance	Cob	$V_{CB} = 5V, I_{E} = 0$			4	pF
		f=1MHz				
Current Gain Bandwidth Product	f _T	$I_C = 10 \text{mA}, V_{CE} = 20 \text{V}$	300			MHz
,		f=100MHz				}
Turn On Time	ton	$V_{CC} = 3V, V_{BE} = 0.5V$			70	ns
		$I_C = 10$ mA, $I_{B1} = 1$ mA				
Turn Off Time	toff	$V_{CC} = 3V$, $I_C = 1mA$			250	ns
		$I_{B1} = I_{B2} = 1mA$				

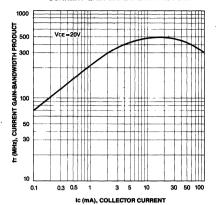
^{*} Pulse Test: Pulse Width \leq 300 μ s, Duty Cycle \leq 2%



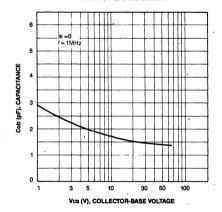
BASE-EMITTER SATURATION VOLTAGE COLLECTOR-EMITTER SATURATION VOLTAGE



CURRENT GAIN-BANDWIDTH PRODUCT



OUTPUT CAPACITANCE



GENERAL PURPOSE TRANSISTOR

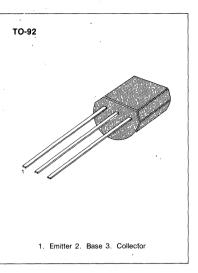
• Collector-Emitter Voltage: V_{CEO} = 40V

• Collector Dissipation: Pc (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	40	V
Collector-Emitter Voltage	V _{CEO}	40	V
Emitter-Base Voltage	V _{EBO}	5	V
Collector Current	Ic	200	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55 ~ 150	°C

[•] Refer to 2N3906 for graphs



Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 10 \mu A, I_{E} = 0$	40		-	V
*Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C = 1 \text{mA}, I_B = 0$	40		İ	V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	5			· V
Base Cut-off Current	I _{BL}	$V_{CE} = 30V$, $V_{BE} = 3V$			50	nA
Collector Cut-off Current	I _{CEX}	V _{CE} =30V, V _{BE} =3V	i		50	nΑ
*DC Current Gain	h _{FE}	$I_C = 0.1 \text{mA}, V_{CE} = 1 \text{V}$	30			
		$I_C = 1mA$, $V_{CE} = 1V$	40			
		$I_C = 10 \text{mA}, V_{CE} = 1 \text{V}$. 50		150	
		$I_C = 50 \text{mA}, V_{CE} = 1 \text{V}$	30			
		I _C =100mA, V _{CE} =1V	15			
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = 10 \text{mA}, I_B = 1 \text{mA}$			0.25	V
,		$I_C = 50 \text{mA}, I_B = 5 \text{mA}$			0.4	V
*Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =10mA, I _B =1mA	0.65		0.85	V
		$I_C = 50 \text{mA}, I_B = 5 \text{mA}$	[·		0.95	V
Current Gain Bandwidth Product	f _T	I _C = 10mA, V _{CE} = 20V	200			MHz
·		f=100MHz				
Output Capacitance	Cob	$V_{CB} = 5V, I_{E} = 0$			4.5	pF
•		f=100KHz				
Turn On Time	ton	$V_{CC} = 3V, V_{BE} = 0.5V$			70	ns
		$I_{C} = 10 \text{mA}, I_{B1} = 1 \text{mA}$,			
Turn Off Time	toff	$V_{CC}=3V$, $I_{C}=10mA$			260	ns
		$I_{B} = I_{B2} = 1 \text{mA}$				

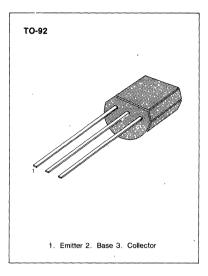
^{*} Pulse Width≤300µs, Duty Cycle≤2%

GÈNERAL PURPOSE TRANSISTOR

- Collector-Emitter Voltage: V_{CEO} = 40V
- Collector Dissipation: Pc (max)=625mW

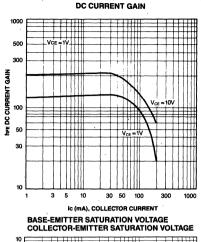
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

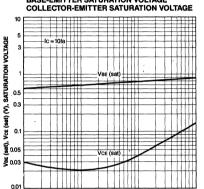
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	40	V
Collector-Emitter Voltage	V _{CEO}	40	· V
Emitter-Base Voltage	V _{EBO}	5	V
Collector Current	Ic	200	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	T,	150	•c
Storage Temperature	Tstg	-55 ~ 150	°C



Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 10 \mu A, I_{E} = 0$	40			V
*Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 1 \text{mA}, I_{B} = 0$	40			' V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	5			V
Base Cut-off Current	IBL	$V_{CE} = 30V, V_{BE} = 3V$			50	· nA
Collector Cut-off Current	I _{CEX}	$V_{CE} = 30V, V_{BE} = 3V$			50	nA
*DC Current Gain	h _{FE}	$I_{C} = 0.1 \text{mA}, V_{CE} = 1 \text{V}$	60			
		I _C =1mA, V _{CE} =1V	80			
		$I_C = 10 \text{mA}, V_{CE} = 1 \text{V}$	100		300	
		Ic = 50mA, V _{CE} = 1V	60			
		$I_C = 100 \text{mA}, V_{CE} = 1 \text{V}$	30			
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = 10 \text{mA}$, $I_B = 1 \text{mA}$			0.25	V
		$I_C = 50 \text{mA}, I_B = 5 \text{mA}$			0.4	V
*Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_C = 10 \text{mA}, I_B = 1 \text{mA}$	0.65		0.85	V
•	1	$I_C = 50 \text{mA}, I_B = 5 \text{mA}$	}		0.95	V
Current Gain Bandwidth Product	f⊤	$I_{C} = 10 \text{mA}, V_{CE} = 20 \text{V}$	250			MHz
		f=100MHz				
Output Capacitance	Cob	$V_{CB} = 5V, I_{E} = 0$			4.5	pF
		f=100KHz				
Turn On Time	ton	$V_{CC} = 3V, V_{BE} = 0.5V$			70	ns
		I _C =10mA, I _{B1} =1mA				l
Turn Off Time	toff	V _{CC} =3V, I _C =10mA			300	ns
		$I_{B1} = I_{B2} = 1mA$				1

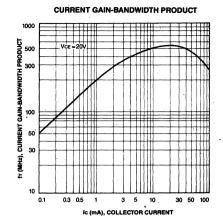
^{*} Pulse Width≤300µs, Duty Cycle≤2%

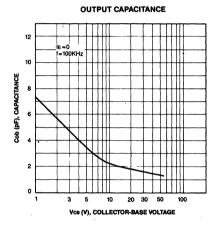




Ic (mA), COLLECTOR CURRENT

0.1



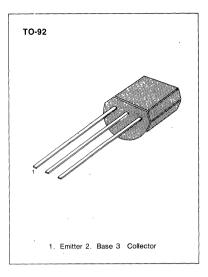


Collector-Emitter Voltage: V_{CEO} = 30V
 Collector Dissipation: P_C (max) = 625mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	40	V
Collector-Emitter Voltage	V_{CEO}	30	V
Emitter-Base Voltage	V_{EBO}	* 5	V
Collector Current	I _C	200	mA
Collector Dissipation	Pc	6 25	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55 ~ 150	°C

[•] Refer to 2N3904 for graphs



Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 10 \mu A, I_{E} = 0$	40			٧
*Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C = 1mA$, $I_B = 0$	30			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	5			V
Collector Cut-off Current	Ісво	$V_{CB} = 20V, I_E = 0$			50	nA.
Emitter Cut-off Current	I _{EBO}	$V_{BE} = 3V, I_{C} = 0$			50	nA
*DC Current Gain	h _{FE}	$I_C = 2mA$, $V_{CE} = 1V$	50		150	
		$I_C = 50 \text{mA}, V_{CE} = 1 \text{V}$	25		,	
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =50mA, I _B =5mA			0.3	V
*Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_C = 50 \text{mA}, I_B = 5 \text{mA}$			0.95	V
Current Gain Bandwidth Product	f _T	I _C =10mA, V _{CE} =20V f=100MHz	250			MHz
Output Capacitance	Cob	$V_{CB} = 5V$, $I_E = 0$ f = 1MHz			4	pF
Collector-Base Capacitance	C _c b	$V_{CB} = 5V, I_{E} = 0$ f=100KHz			4	pF

^{*} Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2%

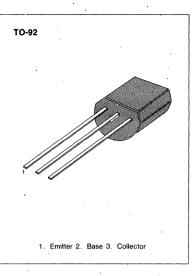
• Collector-Emitter Voltage: V_{CEO} = 25V

• Collector Dissipation: Pc (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	30	V
Collector-Emitter Voltage	V _{CEO}	25	V
Emitter-Base Voltage	V _{EBO}	5	. V •
Collector Current	lc	200	mA
Collector Dissipation	Pc	6 25	mW
Junction Temperature	Tj	150	•€
Storage Temperature	Tstg	−55 ~ 150	°C

[•] Refer to 2N3904 for graphs



Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{\rm C} = 10 \mu A, I_{\rm E} = 0$	30		٠.	V
*Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 1 \text{mA}, I_{B} = 0$	25		ļ	V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	5			/ V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 20V, I_E = 0$		′	50	nA
Emitter Cut-off Current	I _{EBO}	$V_{BE} = 3V, I_{C} = 0$			50	nA
*DC Current Gain	h _{FE}	I _C =2mA, V _{CE} =1V	120		360	
		I _C =50mA, V _{CE} =1V	60			
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =50mA, I _B =5mA			0.3	V
*Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =50mA, I _B =5mA			0.95	V
Current Gain Bandwidth Product	f _T	I _C =10mA, V _{CE} =20V f=100MHz	300			MHz
Output Capacitance	Cob	$V_{CB} = 5V$, $I_E = 0$ f = 1MHz			4	pF
Collector-Base Capacitance	Ccb	$V_{CB} = 5V$, $I_E = 0$ f = 100KHz			4	pF

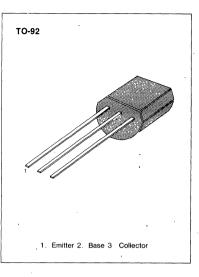
^{*} Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2%

Collector-Emitter Voltage: V_{CEO} = 30 V
 Collector Dissipation: P_C (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Emitter Voltage	V _{CEO}	30	V
Collector-Base Voltage	V _{CBO}	30	٧
Emitter-Base Voltage	V _{EBO}	4	V
Collector Current	lc	200	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	Τj	150	°C
Storage Temperature	Tstg	-55~150	•C

[•] Refer to 2N3906 for graphs



Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
*Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =1mA, I _B =0	30			V
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{\rm C} = 10 \mu A, I_{\rm E} = 0$	30			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A$, $I_C = 0$	4			V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 20V, I_{E} = 0$			50	nA
Emitter Cut-off Current	I _{EBO}	$V_{BE} = 3V, I_{C} = 0$	'		50	nA
*DC Current Gain	h _{EE}	$I_C = 2mA$, $V_{CE} = 1V$	50		150	
		I _C =50mA, V _{CF} =1V	25			
*Collector-Emitter Saturation Voltage	V _{CF} (sat)	$I_{C} = 50 \text{mA}, I_{B} = 5 \text{mA}$			0.4	V
*Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_{C} = 50 \text{mA}, I_{B} = 5 \text{mA}$			0.95	
Current Gain Bandwidth Product	f _T	I _C =10mA, V _{CE} =20V f=100MHz	200			MHz
Collector Base Capacitance	Ccb	$V_{CB} = 5V$, $I_E = 0$ $f = 1MHz$			4.5	pF
Noise Figure	NF	I_C = 100 μ A, V_{CE} = 5V R_G = 1K Ω Noise Bandwidth = 10Hz to 15.7KHz		1	5	dB

^{*}Pulse Test: Pulse Width≤300µs, Duty Cycle≤2%

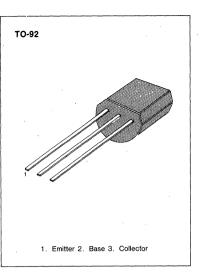
• Collector-Emitter Voltage: V_{CEO} = 25V

• Collector Dissipation: Pc (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Emitter Voltage	V _{CEO}	25	V
Collector-Base Voltage	V _{CBO}	25	V
Emitter-Base Voltage	V _{EBO}	4	V
Collector Current	Ic	200	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55∼150	°C

[•] Refer to 2N3906 for graphs



ELECTRICAL CHARACTERISTICS (Ta = 25°C)

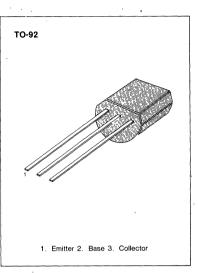
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
*Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =1mA, I _B =0	25			V
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 10 \mu A, I_{E} = 0$	25			V
Emitter-Base Breakdown Voltage	BV _{FBO}	$I_{\rm E} = 10 \mu A$, $I_{\rm C} = 0$	4		}	- V
Collector Cut-off Current	ICBO	V _{CB} = 20V, I _E = 0			50	nA
Emitter Cut-off Current	I _{EBO} ·	$V_{BE} = 3V, I_{C} = 0$			50	nA
*DC Current Gain	hee	I _C =2mA, V _{CE} =1V	120		360	
		I _C =50mA, V _{CE} =1V	60			
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = 50 \text{mA}$, $I_B = 5 \text{mA}$			0.4	V
*Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_C = 50 \text{mA}, I_B = 5 \text{mA}$			0.95	
Current Gain Bandwidth Product	f _T	I _C =10mA, V _{CE} =20V f=100MHz	250			MHz
Collector Base Capacitance	Ccb	V _{CB} =5V, I _E =0 f=1MHz			4.5	pF
Noise Figure	NF	$I_C = 100\mu A$, $V_{CE} = 5V$ $R_g = 1K\Omega$ Noise Bandwidth = 10Hz to 15.7KHz			4	dB

Pulse Test: Pulse Width≤300µs, Duty Cycle≤2%

- Collector-Emitter Voltage: V_{CEO} =40V
- Collector Dissipation: Pc (max)=625mW

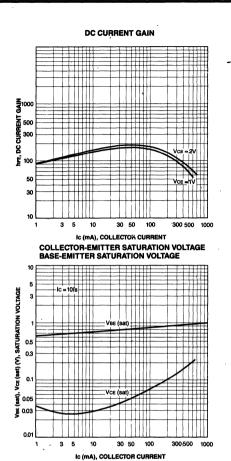
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

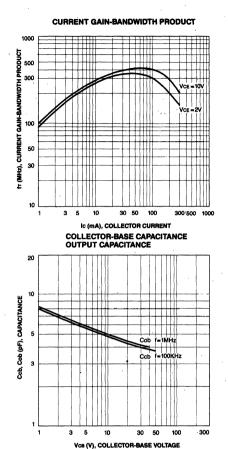
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	60	٧
Collector-Emitter Voltage Emitter-Base Voltage	V _{CEO} V _{EBO}	40 6	V
Collector Current	I _C	600	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	Tj Taka	150	.€
Storage Temperature	Tstg	−55 ~ 150	°C



Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{\rm C} = 100 \mu A, I_{\rm E} = 0$	60		-	V
*Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C = 1 \text{mA}, I_B = 0$	40			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 100 \mu A, I_C = 0$. 6		1	V
Collector Cut-off Current	I _{CEX}	$V_{CE} = 35V, V_{EB} = 0.4V$			100	nA
*DC Current Gain	h _{FE}	$I_C = 1mA$, $V_{CE} = 1V$	20			1
*		$I_C = 10 \text{mA}, V_{CE} = 1 \text{V}$	40		1	
.		$I_{C} = 150 \text{mA}, V_{CE} = 1 \text{V}$	50		150	
		$I_C = 500 \text{mA}, V_{CE} = 2V$	20			
*Coilector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 150 \text{mA}, I_{B} = 15 \text{mA}$			0.4	V
		$I_{C} = 500 \text{mA}, I_{B} = 50 \text{mA}$			0.75	V
*Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_{C} = 150 \text{mA}, I_{B} = 15 \text{mA}$	0.75		0.95	V
	, ,	$I_{C} = 500 \text{mA}, I_{B} = 50 \text{mA}$			1.2	V
Collector-Base Capacitance	Ccb	$V_{CB} = 5V, I_E = 0$			6.5	pF
		f=100KHz		ĺ	1	
Current Gain Bandwidth Product	f⊤	$I_C = 20 \text{mA}, V_{CE} = 10 \text{V}$	200			MHz
•	1	f=100MHz				
Turn On Time	ton	V _{CC} =30V, V _{EB} =2V			35	ns
		I _C =150mA, I _{B1} =15mA				
Turn Off Time	toff	$V_{CC} = 30V$, $I_{C} = 150mA$			255	ns
		$I_{B1} = I_{B2} = 15 \text{mA}$				
			1		1	

^{*} Pulse Test: Pulse Width≤300 µs, Duty Cycle≤2%





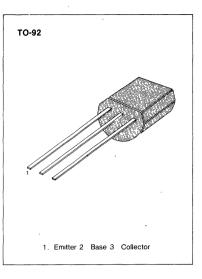
• Collector-Emitter Voltage: V_{CEO} = 40V

• Collector Dissipation: Pc (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	60	v
Collector-Emitter Voltage	V _{CEO}	40	V
Emitter-Base Voltage	V _{EBO}	6	V
Collector Current	l _C	600	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	Ti	150	°C
Storage Temperature	Tstg	-55 ~ 150	°C

[•] Refer to 2N4400 for graphs



Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{ĆBO}	$I_C = 100 \mu A, I_E = 0$	60			V
*Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C = 1mA$, $I_B = 0$	40			v
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 100 \mu A$, $I_C = 0$	6			V
Collector Cut-off Current	I _{CEX}	$V_{CE} = 35V, V_{EB} = 0.4V$			100	nA
*DC Current Gain	h _{FE}	$I_{C} = 0.1 \text{mA}, V_{CE} = 1 \text{V}$	20			
		$I_C = 1mA$, $V_{CE} = 1V$	40			
		$I_{C} = 10 \text{mA}, V_{CE} = 1 \text{V}$	80			
		I _C =150mA, V _{CF} =1V	. 100		300	
		I _C =500mA, V _{CF} =2V	40			
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =150mA, I _B =15mA			0.4	l v l
		I _C =500mA, I _B =50mA			0.75	v
*Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =150mA, I _B =15mA	0.75		0.95	v
	52 ()	I _C =500mA, I _B =50mA			1.2	v
Collector-Base Capacitace	Ccb	V _{CB} =5V, I _E =0			6.5	рF
	_	f=100KHz				
Current Gain Bandwidth Product	f _⊤	I _C =20mA, V _{CE} =10V f=100MHz	250			MHz
Turn On Time	ton	V _{CC} = 30V, V _{EB} = 2V			35	ns
		I _C = 150mA, I _{B1} = 15mA				
Turn Off Time	toff	V _{CC} = 30V, I _C = 150mA			255	ns
		I _{B1} = I _{B2} = 15mA				

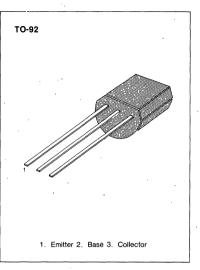
^{*} Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2%

• Collector-Emitter Voltage: V_{CEO} = 40V • Collector Dissipation: P_C (max) = 625mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	40	V
Collector-Emitter Voltage	V _{CEO}	40	V
Emitter-Base Voltage	V _{EBO}	5	. V
Collector Current	l _c	600	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	Tj	150	•c
Storage Temperature	Tstg	-55∼150	•c

[•] Refer to 2N4403 for graphs



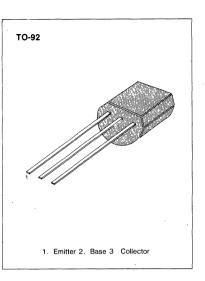
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =0.1mA, I _E =0	40			V
*Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 1 \text{mA}, I_{B} = 0$	40			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 0.1 \text{mA}, I_C = 0$	5			V
Collector Cut-off Current	I _{CEX}	$V_{CE} = 35V, V_{BE} = 0.4V$			100	nA
Base Cut-off Current	I _{BEV}	V _{CE} =35V, V _{BE} =0.4V			100	nA
DC Current Gain	h _{FE}	$I_C = 1 \text{mA}, V_{CE} = 1 \text{V}$	30			
		$I_C = 10 \text{mA}, V_{CE} = 1 \text{V}$	50			
		$^*I_C = 150 \text{mA}, V_{CE} = 2V$	50		150	
	1	*I _C = 500mA, V _{CE} = 2V	20			
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =150mA, I _B =15mA			0.4	V
•		$I_{C} = 500 \text{mA}, I_{B} = 50 \text{mA}$			0.75	V
*Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =150mA, I _B =15mA	0.75		0.95	V
		I _C =500mA, I _B =50mA			1.3	V
Current Gain Bandwidth Product	f _T	I _C =20mA, V _{CE} =10V f=100MHz	150			MHz
Collector-Base Capacitance	Ccb	V _{CB} =10V, I _E =0 f=140KHz			8.5	pF
Turn On Time	ton	V _{CC} =30V, I _C =150mA			35	ns
· ·		$I_{B1} = 15 \text{mA}, V_{BE} = 2.0 \text{V}$				
Turn Off Time	toff	V _{CC} =30V, I _C =150mA			255	ns
	,	$I_{B1} = I_{B2} = 15 \text{mA}$				

^{*} Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2%

- Collector-Emitter Voltage: V_{CEO} = 40V
- Collector Dissipation: Pc (max)=625mW

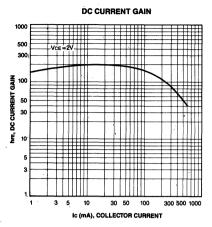
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

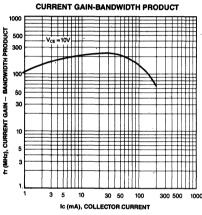
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	40	V
Collector-Emitter Voltage	V _{CEO}	40	V
Emitter-Base Voltage	V _{EBO}	5	V.
Collector Current	l _c	600 625	mA
Collector Dissipation Junction Temperature	P _C	150	mW °C
Storage Temperature	Tstg	-55~150	°C

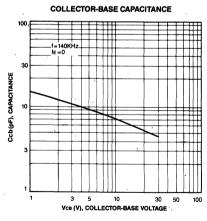


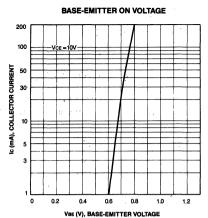
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =0.1mA, I _E =0	40			V
* Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C = 1 \text{mA}, I_B = 0$	40			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 0.1 \text{mA}, I_C = 0$	5			V
Collector Cut-off Current	I _{CEX}	$V_{CE} = 35V, V_{BE} = 0.4V$, ,	100	nA
Base Cut-off Current	I _{BEV}	$V_{CE} = 35V, V_{BE} = 0.4V$			100	nA
DC Current Gain	h _{FE}	$I_C = 0.1 \text{mA}, V_{CE} = 1 \text{V}$	30			
		$I_C = 1mA$, $V_{CE} = 1V$.60			
		$I_C = 10 \text{mA}, V_{CE} = 1 \text{V}$	100			
		* $I_C = 150 \text{mA}, V_{CE} = 2 \text{V}$	100		300	
		* I _C =500mA, V _{CE} =2V	20			
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 150 \text{mA}, I_{B} = 15 \text{mA}$			0.4	V
	1	I _C = 500mA, I _B = 50mA			0.75	V
*Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =150mA, I _B =15mA	0.75		0.95	V
		I _C =500mA, I _B =50mA			1.3	V
Current Gain Bandwidth Product	f _T	I _C =20mA, V _{CE} =10V f=100MHz	200			MHz
Collector-Base Capacitance	Ccb	V _{CB} =10V, I _E =0 f=140KHz			8.5	pF
Turn On Time	ton	V _{CC} =30V, I _C =150mA I _{B1} =15mA, V _{BF} =2.0V			35	ns
Turn Off Time	toff	$V_{CC} = 30V$, $I_{C} = 150mA$ $I_{B1} = I_{B2} = 15mA$,		255	ns

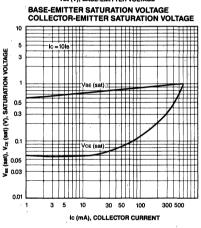
^{*} Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2%









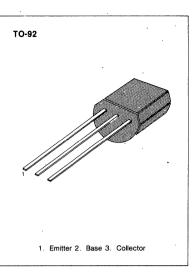


• Collector-Emitter Voltage: V_{CEO} =50V

• Collector Dissipation: Pc (max)=625mW

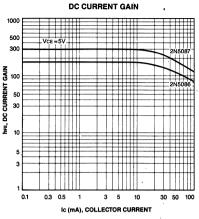
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

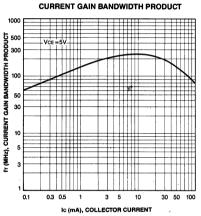
Characteristic	Symbol	Rating	Unit	
Collector-Base Voltage	V _{CBO}	50	V	
Collector-Emitter Voltage	V _{CEO}	50	V	
Emitter-Base Voltage	V _{EBO}	3	V	
Collector Current	I _C	50	mA	
Collector Dissipation	Pc	625	mW	
Junction Temperature	T;	150	°C	
Storage Temperature	Tstg	-55~150	°C	

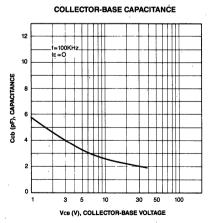


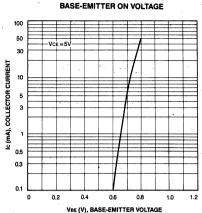
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =100μA, I _E =0	50			v
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C = 1mA$, $I_B = 0$	50			V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 10V, I_{E} = 0$			10	nA
		$V_{CB} = 35V, I_{E} = 0$			50	nA
Emitter Cut-off Current	I _{EBO}	$V_{BE} = 3V, I_{C} = 0$			50	nA
DC Current Gain	h _{FE}	$I_{C} = 100 \mu A$, $V_{CE} = 5 V$	150		500	
		$I_C = 1mA$, $V_{CE} = 5V$	150			
		$^{*}I_{C} = 10 \text{mA}, V_{CF} = 5 \text{V}$	150			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = 10 \text{mA}, I_B = 1 \text{mA}$	'		0.3	V
Base-Emitter On Voltage	V _{BE} (on)	$I_C = 1mA$, $V_{CE} = 5V$			0.85	V
Current Gain Bandwidth Product	f _T	$I_C = 500 \mu A, V_{CE} = 5V$ f=20MHz	40			MHz
Collector-Base Capacitance	Ccb	$V_{CB} = 5V, I_{E} = 0$ f=100KHz			4	pF
Noise Figure	NF	$I_C = 20 \mu A$, $V_{CE} = 5V$ $R_S = 10 K\Omega$		· .	3	dB
		f =10Hz to 15.7KHz I_C =100 μ A, V_{CE} =5V R_S =3K Ω , f =1KHz			3	dB

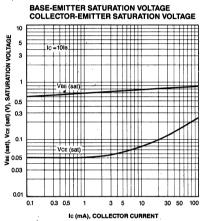
^{*} Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%









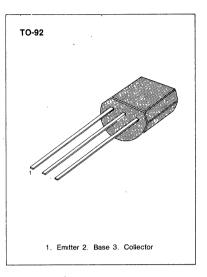


Collector-Emitter Voltage: V_{CEO} = 50V
 Collector Dissipation: P_C (max) = 625mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	V
Collector-Emitter Voltage	V _{CEO}	50	V
Emitter-Base Voltage	V _{EBO}	3	V
Collector Current	Ic	50	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55 ~ 150	•C

^{*} Refer to 2N5086 for graphs



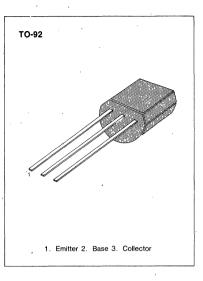
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 100 \mu A, I_{E} = 0$	50			V
*Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C = 1mA$, $I_B = 0$	50			V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 10V, I_E = 0$			10	nA
		$V_{CB} = 35V, I_{E} = 0$			50	, nA
Emitter Cut-off Current	I _{EBO}	$V_{BE} = 3V, I_{C} = 0$			50	nA
DC Current Gain	h _{FE}	$I_{C} = 100 \mu A$, $V_{CE} = 5 V$.250		800	
•		$I_C = 1mA$, $V_{CE} = 5V$	250			
•		*I _C = 10mA, V _{CE} = 5V	250			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1mA			0.3	V
Base-Emitter On Voltage	V _{BE} (on)	$I_C = 1mA$, $V_{CE} = 5V$			0.85	V
Current Gain Bandwidth Product	f _T	$I_C = 500 \mu A, V_{CE} = 5V$ f=20MHz	40	-		MHz
Collector-Base Capacitance	Ccb	V _{CB} =5V, I _E =0 f=100KHz			4	pF
Noise Figure	NF ·	$I_C = 20 \mu A$, $V_{CE} = 5V$ $R_S = 10 K\Omega$			2	dB
		f=10Hz to 15.7KHz I_C =100 μ A, V_{CE} =5V R_S =3KΩ, f=1KHz		,	2	dB

^{*} Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2%

Collector-Emitter Voltage: V_{CEO} = 30V
 Collector Dissipation: P_c (max)=625mW

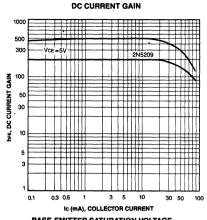
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

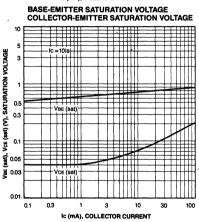
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	35	v
Collector-Emitter Voltage	V _{CEO}	30	V
Emitter-Base Voltage	V _{EBO}	4.5	V
Collector Current	Ic	50	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstq	-55 ~ 150	°C

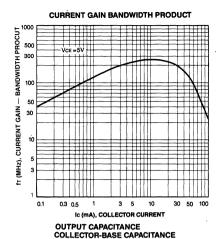


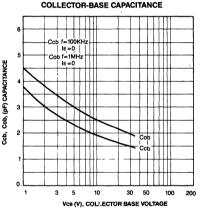
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
*Collector-Base Breakdown Voltage	BV _{CBO}	I _C =100μA, I _E =0	35			V
*Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C = 1mA$, $I_B = 0$	30			V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 20V, I_{E} = 0$			50	nA
Emitter Cut-off Current	I _{EBO}	$V_{BE} = 3V$, $I_C = 0$			50	nA
		$V_{BE} = 4.5V, I_{C} = 0$			100	nA
DC Current Gain	h _{FE}	$I_C = 100 \mu A$, $V_{CE} = 5V$	300		900	
		$I_C = 1mA$, $V_{CE} = 5V$	350			
<u>,</u>		$^*I_C = 10 \text{mA}, V_{CE} = 5 \text{V}$	300			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = 10 \text{mA}, I_B = 1 \text{mA}$			0.5	V
*Base-Emitter On Voltage	V _{BE} (on)	$I_C = 10 \text{mA}, V_{CE} = 5 \text{V}$		ŀ	0.8	V
Current Gain Bandwidth Product	f⊤	$I_{C} = 500 \mu A, V_{CE} = 5V$ f=20MHz	50			MHz
Collector Base Capacitance	Ccb	$V_{CB} = 5V_{x}I_{E} = 0$ f=100KHz			4	pF
Noise Figure	NF	$I_{C} = 100 \mu A, V_{CE} = 5V$ $R_{S} = 10 K\Omega$			3	dB
		f=10Hz to 15.7KHz		-		

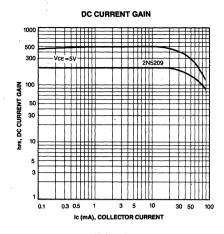
^{*} Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2%

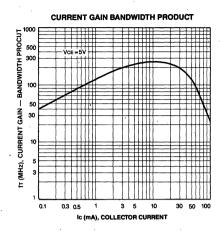


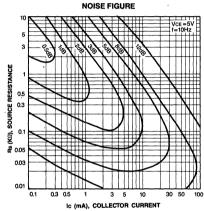










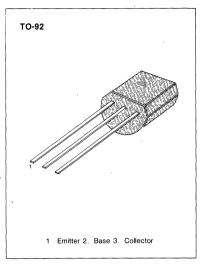


• Collector-Emitter Voltage: V_{CEO} = 25V • Collector Dissipation: P_C (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	30	V
Collector-Emitter Voltage	V _{CEO}	25	V
Emitter-Base Voltage	V_{EBO}	4.5	V
Collector Current	Ic	50	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	T,	150	∘C
Storage Temperature	Tstg	-55~150	°C

• Refer to 2N5088 for graphs



Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{\rm C} = 100 \mu A, I_{\rm E} = 0$	30			V
*Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C = 1 \text{mA}, I_B = 0$	25			V
Collector Cut-off Current	Ісво	$V_{CB} = 15V, I_{E} = 0$			50	nA
Emitter Cut-off Current	I _{EBO}	$V_{BE} = 3V, I_{C} = 0$			50	nA
		$V_{BE} = 4.5 \text{V}, I_{C} = 0$			100	nA
DC Current Gain	h _{FE}	$I_{\rm C} = 100 \mu A, V_{\rm CE} = 5 V$	400		1200	
	\.	I _C =1mA, V _{CE} =5V	450			
	1	*I _C =10mA, V _{CE} =5V	400			l
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1mA			∙0.5	V
*Base-Emitter On Voltage	V _{BE} (on)	I _C =10mA, V _{CE} =5V			0.8	V
Current Gain Bandwidth Product	f _T	$I_C = 500 \mu A, V_{CE} = 5V$ f=20MHz	50	•		MHz
Collector Base Capacitance	Ccb	V _{CB} =5V, I _E =0 f=100KHz			4	pF
Noise Figure	NF	$I_C = 100 \mu A$, $V_{CE} = 5V$ $R_S = 10 KΩ$			2	dB
		f=10Hz to 15.7KHz	i			

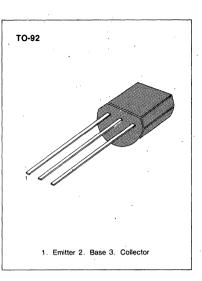
^{*} Pulse Test: Pulse Width ≤300µs, Duty Cycle ≤ 2%

Collector-Emitter Voltage: V_{CEO} = 50V
 Collector Dissipation: P_C (max) = 625mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	٧
Collector-Emitter Voltage	· V _{CEO}	50	V
Emitter-Base Voltage	V _{EBO}	4.5	V
Collector Current	Ic	50	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	T,i	150	°C
Storage Temperature	Tstg	-55~150	°C

[•] Refer to 2N5088 for graphs



Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_C = 100 \mu A, I_E = 0$	50			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C = 1mA$, $I_B = 0$	50	,		V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 35V, I_{E} = 0$			50	nA
Emitter Cut-off Current	I _{EBO}	V _{BE} = 3V, I _C = 0			50	nA
DC Current Gain	h _{FE}	$I_C = 100 \mu A, V_{CE} = 5V$	100		300	}
		I _C =1mA, V _{CE} =5V	150			
		*I _C =10mA, V _{CE} =5V	150			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1mA			0.7	v
Base-Emitter On Voltage	V _{BE} (on)	I _C =1mA, V _{CE} =5V			0.85	. v
Current Gain Bandwidth Product	f _T	$I_{C} = 500 \mu A, V_{CE} = 5V$ f = 20MHz	30			MHz
Collector Base Capacitance	Ccb	V _{CB} =5V, I _E =0 f=100KHz		•	4	pF
Noise Figure	NF	$I_C = 20\mu A$, $V_{CE} = 5V$ $R_S = 22K\Omega$			3	dB
		f=10Hz to 15.7KHz	,			-10
		$I_C = 20\mu A$, $V_{CE} = 5V$ $R_S = 10K\Omega$, $f = 1KHz$			4	dB

^{*} Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%

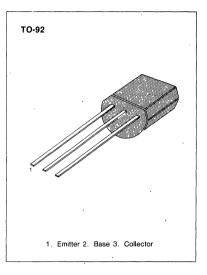
• Collector-Emitter Voltage: V_{CEO} = 50V

• Collector Dissipation: Pc (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Junction Temperature Storage Temperature	V _{CBO} V _{CEO} V _{EBO} I _C P _C T _j Tstq	50 50 4.5 50 625 150 -55~150	V V WA mW °C

^{*} Refer to 2N5088 for graphs



Characteristic	Symbol	Test Conditions	Min	• Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{\rm C} = 100 \mu A, I_{\rm E} = 0$	50			V
*Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{\rm C} = 1 {\rm mA}, I_{\rm B} = 0$	50			V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 35V, I_{E} = 0$			50	nA
Emitter Cut-off Current	I _{EBO}	$V_{BE} = 3V, I_{C} = 0$			50	nA
DC Current Gain	h _{FE}	$I_{C} = 100 \mu A$, $V_{CF} = 5 V$	200		600	
•		Ic=1mA, Vc==5V	250			
		*Ic = 10mA, Vcf = 5V	250			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 10 \text{ mA}, I_{B} = 1 \text{ mA}$	7.7	,	0.7	V
Base-Emitter On Voltage	V _{BE} (on)	$I_C = 1 \text{mA}$, $V_{CE} = 5 \text{V}$			0.85	v
Current Gain Bandwidth Product	f⊤	$I_C = 500 \mu A$, $V_{CE} = 5V$ f = 20MHz	30		,	MHz
Collector Base Capacitance	Ccb	V _{CB} =5V, I _E =0 f=100KHz			4	pF
Noise Figure	NF	$I_C = 20\mu A$, $V_{CE} = 5V$ $R_S = 22K\Omega$			2	dB
		f =10Hz to 15.7KHz I_C =20 μ A, V_{CE} =5V R_S =10K Ω , f =1KHz			3	dB

^{*} Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2%

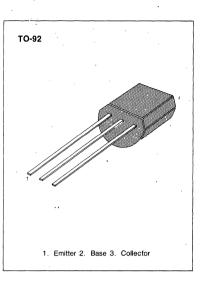
• Collector-Base Voltage: V_{CEO} =120V

• Collector Dissipation: Pc (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Junction Temperature Storage Temperature	V _{CBO} V _{CEO} V _{EBO} I _C P _C Tj	130 120 5 600 625 150 -55~150	V V V mA mW °C °C

^{*} Refer to 2N5401 for graphs



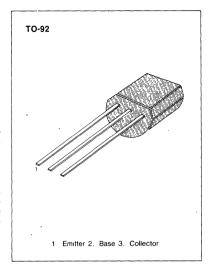
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 100 \mu A, I_{E} = 0$	130			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 1 \text{mA}, I_{B} = 0$	120			У
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	5			V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 100V, I_{E} = 0$			100	nA
Emitter Cut-off Current	I _{EBO}	$V_{EB} = 3V, I_{C} = 0$			50	nA
*DC Current Gain	h _{FE}	$I_C = 1mA$, $V_{CE} = 5V$	30			
		$I_{c} = 10 \text{mA}, V_{ce} = 5 \text{V}$	40		180	
		$I_C = 50 \text{mA}, V_{CE} = 5 \text{V}$	40			
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = 10 \text{mA}$, $I_B = 1 \text{mA}$			0.2	l v
	52 ()	I _C =50mA, I _B =5mA	1		0.5	V
*Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_{C} = 10 \text{mA}, I_{B} = 1 \text{mA}$			1	V
	52 (,	$I_C = 50 \text{mA}$, $I_B = 5 \text{mA}$	`	, , , , , , , , , , , , , , , , , , ,	1	l v
Current Gain Bandwidth Product	f⊤	I _C = 10mA, V _{CE} = 10V f=100MHz	100		400	MHz
Output Capacitance	Cob	V _{CB} = 10V, I _E = 0 f=1MHz			6	pF
Noise Figure	NF	$I_{\rm C} = 250 \mu A, V_{\rm CE} = 5 V$			8	dB
		$R_s = 1K\Omega$				
·		f=10Hz to 15.7KHz				

^{*} Pulse Test: Pulse Width≤300µs, Duty Cycle≤2%

- Collector-Emitter Voltage: V_{CEO} =150V
- Collector Dissipation: Pc (max)=625mW

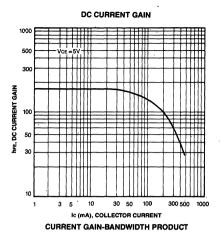
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

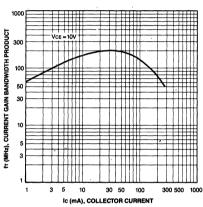
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	160	V
Collector-Emitter Voltage	V _{CEO}	150	V
Emitter-Base Voltage	V _{EBO}	[•] 5	V
Collector Current	l _c	600	mA
Collector Dissipation	P _C	625	mW
Junction Temperature	T.,	150	°C
Storage Temperature	Tstg	-55~150	°C

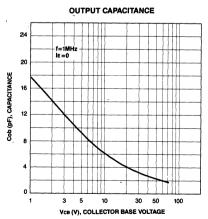


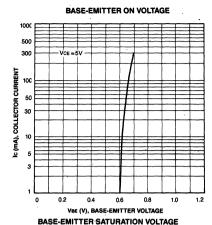
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{\rm C} = 100 \mu A, I_{\rm E} = 0$	160			V
*Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 1 \text{mA}, I_{B} = 0$	150		1	V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	5		1	V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 120V, I_{E} = 0$			50	nA
Emitter Cut-off Current	I _{EBO}	$V_{EB} = 3V, I_{C} = 0$			50	nA
*DC Current Gain	h _{FE}	$I_C = 1mA$, $V_{CE} = 5V$	50		}	
		$I_C = 10 \text{mA}, V_{CE} = 5 \text{V}$. 60		240	
		$I_C = 50 \text{mA}, V_{CE} = 5 \text{V}$	50			
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = 10 \text{mA}$, $I_B = 1 \text{mA}$			0.2	V
,		$I_C = 50 \text{mA}, I_B = 5 \text{mA}$			0.5	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_C = 10 \text{mA}, I_B = 1 \text{mA}$			1	V
•	,	$I_C = 50 \text{mA}, I_B = 5 \text{mA}$			1	V
Current Gain Bandwidth Product	f _T	$I_C = 10 \text{mA}, V_{CE} = 10 \text{V}$	100		300	MHz
•		f=100MHz				
Output Capacitance	Cob	$V_{CB} = 10V, I_{E} = 0$			6	pF
		f=1MHz				
Noise Figure	NF	$I_{C} = 250 \mu A, V_{CE} = 5V$			8	dB
•		$R_S = 1K\Omega$	'		1	
		f=10Hz to 15.7KHz	1.			

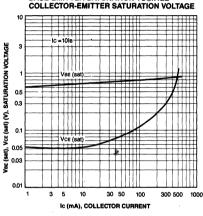
^{*} Pulse Test: Pulse Width≤300 µs, Duty Cycle≤2%











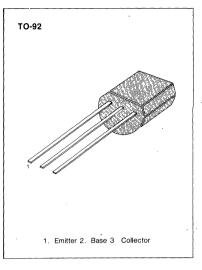
• Collector-Emitter Voltage: V_{CEO} = 140V

• Collector Dissipation: Pc (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Junction Temperature Storage Temperature	VCBO VCEO VEBO IC PC Tj	160 140 6 600 625 150 -55~150	V V V mA mW °C °C

[•] Refer to 2N5551 for graphs



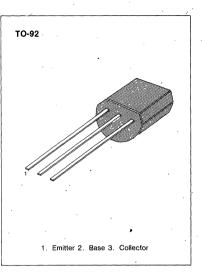
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 100 \mu A, I_{E} = 0$	160			٧
*Collector-Emitter Saturation Voltage	BV _{CEO}	$I_{C} = 1mA, I_{B} = 0$	140			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	6			V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 100V, I_{E} = 0$,	100	nA
Emitter Cut-off Current	I _{EBO}	$V_{BE} = 4V, I_{C} = 0$		}	50	nA
*DC Current Gain	h _{FE}	$I_C = 1mA$, $V_{CE} = 5V$	60			
		$I_C = 10 \text{mA}, V_{CE} = 5 \text{V}$	60		250	
•		$I_C = 50 \text{mA}, V_{CE} = 5 \text{V}$	20			
* Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = 10 \text{mA}, I_B = 1 \text{mA}$			0.15	V
		I _C =50mA, I _B =5mA			0.25	V
*Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_C = 10 \text{mA}, I_B = 1 \text{mA}$			1	V
		$I_C = 50 \text{mA}, I_B = 5 \text{mA}$			1.2	V
Current Gain Bandwidth Product	f _τ	I _C =10mA, V _{CE} =10V f=100MHz	100		300	MHz
Output Capacitance	Cob	V _{CB} = 10V, I _E = 0 f=1MHz			6	pF
Noise Figure	NF	$I_C = 250 \mu A$, $V_{CE} = 5V$ $R_S = 1K\Omega$ f = 10Hz to 15.7KHz			10	dB

^{*} Pulse Test: Pulse Width≤300µs, Duty Cycle≤2%

Collector-Emitter Voltage: V_{CEO} = 160V
 Collector Dissipation: P_C(max) = 625mW

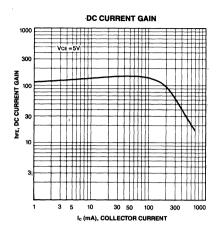
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

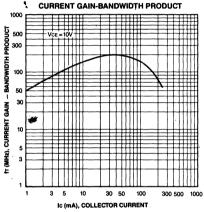
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	180	V
Collector-Emitter Voltage	V _{CEO}	160	V
Emitter-Base Voltage	V _{EBO}	6	V.
Collector Current	l _C	600	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55~150	°C
•	1 -	1	-

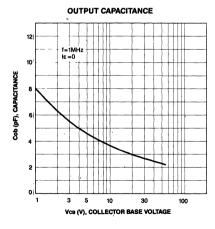


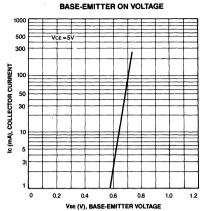
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 100 \mu A, I_{E} = 0$	180			V
*Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{\rm C} = 1 {\rm mA}, I_{\rm B} = 0$	160			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	6			V
Collector Cut-off Current	Ісво	V _{CB} = 120V, I _E = 0			50	nA
Emitter Cut-off Current	I _{EBO}	$V_{BE} = 4V, I_{C} = 0$			50	nA
*DC Current Gain	hee	I _C =1mA, V _{CF} =5V	80			
		$I_{C} = 10 \text{mA}, V_{CE} = 5 \text{V}$.80		250	
		I _C =50mA, V _{CE} =5V	30			1
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1mA	,		0.15	V
J	02 (11)	$I_C = 50 \text{mA}, I_B = 5 \text{mA}$			0.2	V
*Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =10mA, I _B =1mA			1	V
J		I _C =50mA, I _B =5mA			1	V
Current Gain Bandwidth Product	fr	I _C = 10mA, V _{CF} = 10V	100		300	MHz
		f=100MHz				1
Output Capacitance	Cob	V _{CB} = 10V, I _E = 0			6	pF
		f=1MHz	}			1
Noise Figure	NF	$I_{\rm C} = 250 \mu A$, $V_{\rm CE} = 5V$			8	dB
		$R_s = 1K\Omega$				
•		f=10Hz to 15.7KHz				1 .

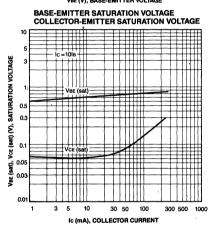
^{*}Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2%









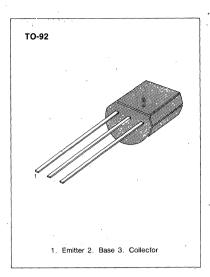


DARLINGTON TRANSISTOR

- Collector-Emitter Voltage: V_{CEO} = 40V
- Collector Dissipation: Pc (max)=625mW

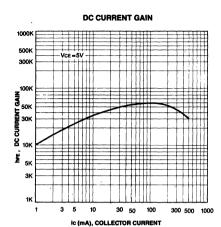
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Emitter Voltage	V _{CEO}	40	V
Collector-Base Voltage	V _{CBO}	40	V
Emitter-Base Voltage	V _{EBO}	12	V
Collector Current	· Ic	500	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	T _j	150	°C
Storage Temperature	Tstg	-55~150	°C -

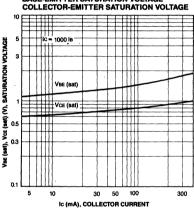


Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
*Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =10mA, I _B =0	40			V
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{\rm C} = 100 \mu A, I_{\rm E} = 0$	40		auto.	V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A$, $I_C = 0$	12		**	V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 30V, I_{E} = 0$			50	nA
Collector Cut-off Current	I _{CEO}	V _{CE} = 25V, I _B = 0			1	μA
Emitter Cut-off Current	1 _{EBÓ}	$V_{BE} = 10V, I_{C} = 0$			50	nA
DC Current Gain	h _{FE}	$I_C = 10 \text{mA}, V_{CE} = 5 \text{V}$	10K		100K	1
		$I_{C} = 100 \text{mA}, V_{CE} = 5 \text{V}$	20K		200K	
,		$I_{C} = 500 \text{mA}, V_{CE} = 5 \text{V}$	14K		140K	l
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 50 \text{mA}, I_{B} = 0.5 \text{mA}$		0.71	1.2	V
		$I_{C} = 500 \text{mA}, I_{B} = 0.5 \text{mA}$		0.9	1.5	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_{C} = 500 \text{mA}, I_{B} = 0.5 \text{mA}$		1.52	2	V
Base-Emitter On Voltage	V _{BE} (on)	$I_C = 50 \text{mA}, V_{CE} = 5 \text{V}$		1.24	1.75	V
Output Capacitance	Cob	V _{CB} = 10V, I _E = 0		5.4	7	pF
, .	1	f=1MHz				1
Noise Figure	NF	$I_C = 1mA$, $V_{CE} = 5V$		3	10	dB
-	1	$R_S = 100 K\Omega$				
		f=10KHz to 15.7 KHz				1

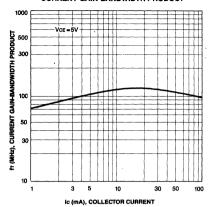
^{*}Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2%



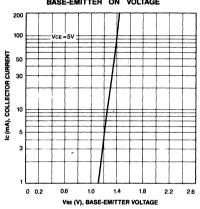
BASE-EMITTER SATURATION VOLTAGE



CURRENT GAIN-BANDWIDTH PRODUCT



BASE-EMITTER ON VOLTAGE



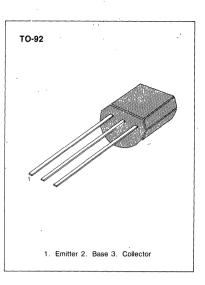
• Collector-Emitter Voltage: V_{CEO} = 50V

• Collector Dissipation: Pc (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta =25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	60	V
Collector-Emitter Voltage	V _{CEO}	50	-v
Emitter-Base Voltage	V _{EBO}	6	V
Collector Current	Ic	200	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	LT.	150	•C
Storage Temperature	Tstg ⁻	-55∼150	°C

[•] Refer to 2N5088 for graphs



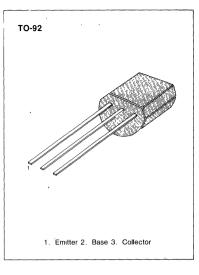
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{\rm C} = 100 \mu A, I_{\rm E} = 0$	60			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 1 \text{mA}, I_{B} = 0$	50			V
Collector Cut-off Current	I _{CBO}	V _{CB} =30V, I _E =0		!	10	nA
Collector Cut-off Current	I _{CEO}	V _{CE} =30V, I _B =0			25	nA
Emitter Cut-off Current	I _{EBO}	$V_{BE} = 5V, I_{C} = 0$			10	nA
DC Current Gain	h _{FE}	$I_{\rm C} = 10 \mu A$, $V_{\rm CE} = 5 V$	250			
		$I_{\rm C} = 100 \mu A$, $V_{\rm CE} = 5 V$	250		650	
	į	I _C =1mA, V _{CE} =5V	250			
		$I_{c} = 10 \text{mA}, V_{CE} = 5 \text{V}$	250			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 10 \text{mA}, I_{B} = 0.5 \text{mA}$			0.2	V.
	} ` `	$I_{C} = 100 \text{mA}, I_{B} = 5 \text{mA}$			0.6	V
Base-Emitter On Voltage	V _{BE} (on)	$I_C = 1 \text{mA}, V_{CE} = 5 \text{V}$	0.56		0.66	V
Current Gain Bandwidth Product	f _T	$I_C = 1 \text{mA}, V_{CE} = 5V$ f=100MHz	100		700	MHz
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1MHz		,	3	pF
Noise Figure/Noise Voltage Level .	NF/N _v	$I_C = 100 \mu A$, $V_{CE} = 5V$ (1) $R_S = 10KΩ$, $BW = 1Hz$ f = 100Hz			3/18.1	dB/nV
		(2) R _S =50KΩ, BW=15.7KH f=10Hz—10KHz	łz		6/5.7	dΒ/μV
		(3) R _S = 500Ω, BW=1Hz f=10Hz			3.5/4.3	dB/nV

Collector-Emitter Voltage: V_{CEO} = 50V
 Collector Dissipation: P_C (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage	V _{CBO}	60 50	V
Emitter-Base Voltage	V _{EBO}	6	V
Collector Current Collector Dissipation	I _C	200 625	mA mW
Junction Temperature Storage Temperature	T _J Tstg	150 -55~150	.c .c

[•] Refer to 2N5088 for graphs



Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{\rm C} = 100 \mu A, I_{\rm E} = 0$	60	**		V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C = 1 \text{mA}, I_B = 0$	50			V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 30V, I_{E} = 0$			10	nA
Collector Cut-off Current	I _{CEO}	$V_{CE} = 30V, I_B = 0$			25	nA
Emitter Cut-off Current	I _{EBO}	$V_{BE} = 5V, I_{C} = 0$			10	nA
DC Current Gain	h _{FE}	$I_{C} = 10 \mu A, V_{CE} = 5V$	250			
•		$I_C = 100 \mu A, V_{CE} = 5V$	250		650	
		$I_C = 1mA, V_{CE} = 5V$	250			1
		$l_C = 10 \text{mA}, V_{CE} = 5 \text{V}$	250			1
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 10 \text{mA}, I_{B} = 0.5 \text{mA}$			0.2	V
		$I_C = 100 \text{mA}, I_B = 5 \text{mA}$			0.6	V
Base-Emitter On Voltage	V _{BE} (on)	$I_C = 1mA, V_{CE} = 5V$	0.56		0.66	V
Current Gain Bandwidth Product	f _T	$I_C = 1mA$, $V_{CE} = 5V$ f = 100MHz	100		700	MHz
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1MHz			3	pF
Noise Figure/Noise Voltage Level	NF/N _v	$I_{\rm C} = 100 \mu A, V_{\rm CE} = 5 V$				
,		(1) R _s = 10KΩ, BW=1Hz f=100Hz			2/16.2	dB/nV
		(2) R _S =50KΩ, BW=15.7KI f=10Hz—10KHz	Hz .		4/4.6	dB/μV
		(3) R _S =50Ω, BW=1Hz f=10Hz			3/4.1	dB/nV

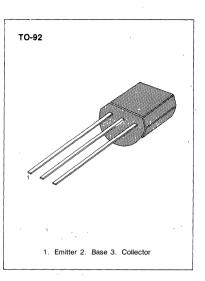
HIGH VOLTAGE TRANSISTOR

• Collector-Emitter Voltage: V_{CEO} = 250V

• Collector Dissipation: Pc (max)=625mW

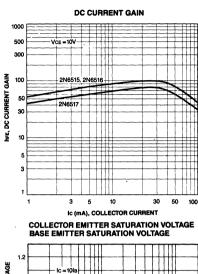
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

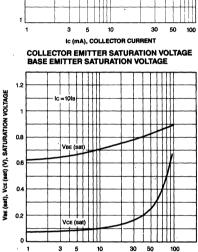
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Junction Temperature Storage Temperature	V _{CBO} V _{CEO} V _{EBO} I _C P _C T _J Tstg	250 250 6 500 625 150 -55~150	V V V mA mW °C



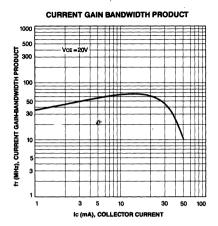
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
*Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =1mA, I _B =0	250			V
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{\rm C} = 100 \mu A, I_{\rm E} = 0$	250			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_{\rm E} = 10 \mu A$, $I_{\rm C} = 0$	6			V
Collector Cut-off Current	Iceo	$V_{CB} = 150V$, $I_E = 0$			50	nA
Emitter Cut-off Current	I _{EBO}	$V_{BE} = 5V, I_{C} = 0$			50	nA
*DC Current Gain	hee	Ic=1mA, Vc==10V	35			
	****	I _C = 10mA, V _{CF} = 10V	50			İ
		$I_{c} = 30 \text{mA}, V_{ce} = 10 \text{V}$	50		300	ļ
•		I _C =50mA, V _{CF} =10V	45		220	1
		I _C =100mA, V _{CE} =10V	25			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C = 10mA, I _B = 1mA			0.3	V
	TOE (COLL)	I _C =20mA, I _B =2mA			0.35	V
		I _C =30mA, I _B =3mA			0.5	V
•		I _C =50mA, I _B =5mA			1	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	Ic=10mA, I _B =1mA			0.75	V
	T BE (out)	I _C =20mA, I _B =2mA			0.85	V
		I _C =30mA, I _B =3mA			0.9	V
Collector-Base Capacitance	Ccb	V _{CB} = 20V, I _E = 0			6	pF
	1000	f=1MHz				,
*Current Gain Bandwidth Product	f⊤	I _C = 10mA, V _{CE} = 20V	40	,	200	MHz
	1 "	f=20MHz				1
Base Emitter On Voltage	·V _{BE} (on)	I _C =100mA, V _{CE} =10V			2	V

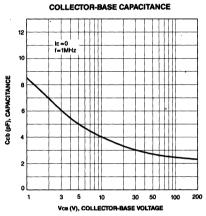
^{*} Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2%





Ic (mA), COLLECTOR CURRENT





HIGH VOLTAGE TRANSISOTR

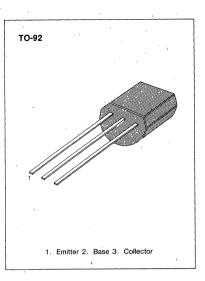
• Collector-Emitter Voltage: V_{CEO} =300V

• Collector Dissipation: Pc (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	300	V
Collector-Emitter Voltage	V _{CEO}	300	V
Emitter-Base Voltage	V_{EBO}	6	V
Collector Current	l _C	500	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	T,	150	°C
Storage Temperature	Tstg	-55~150	°C
			1

Refer to 2N6515 for graphs



Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
* Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =1mA, I _B =0	300			. v
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 100 \mu A, I_{E} = 0$	300		}	V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	6			V
Collector Cut-off Current	I _{CBO}	V _{CB} = 200V, I _E = 0			50	nA
Emitter Cut-off Current	I _{EBO}	$V_{EB} = 5V, I_{C} = 0$	1:		50	nA
*DC Current Gain	h _{FE}	I _C =1mA, V _{CE} =10V	30		}	}
		I _C =10mA, V _{CE} =10V	45			}
•		$I_{C} = 30 \text{mA}, V_{CE} = 10 \text{V}$	45		270	
•		I _C =50mA, V _{CE} =10V	40		200	
•		I _C =100mA, V _{CE} =10V	20			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1mA			0.3	V
,		I _C =20mA, I _B =2mA			0.35	V
å		I _C =30mA, I _B =3mA			0.5	V
		I _C =50mA, I _B =5mA			1	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_C = 10 \text{mA}, I_B = 1 \text{mA}$			0.75	
		I _C =20mA, I _B =2mA	,		0.85	
,	1.	I _C =30mA, I _B =3mA			0.9	
Collect-Base Capacitance	Ccb	$V_{CB} = 20V, I_E = 0$			6	pF
Concor-base Capacitance		f=1MHz				Pi
*Current Gain Bandwidth Product	f _T	I _C =10mA, V _{CE} =20V	40		200	MHz
,		f=20MHz				
Base Emitter On Voltage	V _{BE} (on)	I _C =100mA, V _{CE} =10V			2	V

^{*} Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2%

HIGH VOLTAGE TRANSISOTR

• Collector-Emitter Voltage: V_{CEO} = 350V

• Collector Dissipation: Pc (max)=625mW

Characteristic Symbol Rating Unit Collector-Base Voltage V_{CBO} 350 ν Collector-Emitter Voltage 350 V_{CEO} ν **Emitter-Base Voltage** V_{EBO} 6 Collector Current 500 lc mΑ Collector Dissipation P_{C} 625 mW

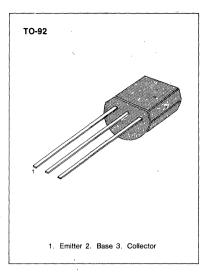
Тj

Tstg

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Junction Temperature

Storage Temperature



ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
*Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =1mA, I _B =0	350			٧
Collector-Base Breakdown Voltage	BV _{CBO}	$I_C = 100 \mu A, I_E = 0$	350			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	6			V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 250V, I_{E} = 0$			50	nA
Emitter Cut-off Current	I _{EBO}	$V_{EB} = 5V, I_{C} = 0$		i	50	nA
*DC Current Gain	h _{FE}	$I_C = 1mA$, $V_{CE} = 10V$	20			
	İ	$I_C = 10 \text{mA}, V_{CE} = 10 \text{V}$	30			
		I _C =30mA, V _{CE} =10V	30		200	
		I _C =50mA, V _{CE} =10V	20		200	
		I _C =100mA, V _{CE} =10V	15			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1mA			0.3	V
		I _C =20mA, I _B =2mA	1		0.35	V
		I _C =30mA, I _B =3mA			0.5	V
		I _C =50mA, I _B =5mA			1	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =10mA, I _B =1mA			0.75	V.
		I _C =20mA, I _B =2mA			0.85	V
		I _C =30mA, I _B =3mA			0.9	V
Collect-Base Capacitance	Ccb	$V_{CB} = 20V, I_{E} = 0$			õ	pF
		f=1MHz				
*Current Gain Bandwidth Product	f _T '	$I_C = 10 \text{mA}, V_{CE} = 20 \text{V}$	40		200	MHz
		f=20MHz				
Base Emitter On Voltage	V _{BE} (on)	I _C =100mA, V _{CE} =10V			2	V

150

-55~150

°C

°C

[•] Refer to 2N6515 for graphs

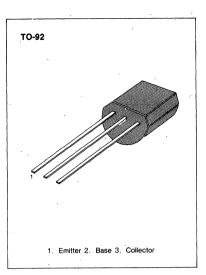
^{*} Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2%

HIGH VOLTAGE TRANSISTOR

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-250	٧.
Collector-Emitter Voltage	V _{CEO}	-250	V
Emitter-Base Voltage	V _{EBO}	- 5	V
Collector Current	lc	-500	mA
Base Current	l _B .	-250	mA
Collector Dissipation	.Pc	0.625	W
Derate above 25°C		5	mW/°C
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55∼150	°C

[•] Refer to 2N6520 for graphs



Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector Base Breakdown Voltag	BV _{CBO}	I _C =-100μA, I _E =0	-250		٧
*Collector Emitter Breakdown Voltage	BVCEO	$I_{C} = -1 \text{ mA}, I_{B} = 0$	-250		V
Emitter Base Breakdown Voltage	BV _{EBO}	$I_E = -10\mu A, I_C = 0$	-5		V
Collector Cutoff Current	Ісво	$V_{CB} = -150V, I_E = 0$		-50	nA
Emitter Cutoff Current	I _{EBO}	$V_{EB} = -4V, I_{C} = 0$		-50	nA
*DC Current Gain	h _{FE}	$V_{CE} = -10V, I_{C} = -1mA$	35		
	1	$V_{CE} = -10V, I_{C} = -10mA$	50		
		V _{CE} =-10V, I _C =-30mA	. 50	300	
		$V_{CE} = -10V$, $I_{C} = -50mA$	45	220	
	ļ	V _{CE} =-10V, I _C =-100mA	25		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =-10mA, I _B =-1mA		-0.30	V
		$I_C = -20 \text{mA}, I_B = -2 \text{mA}$		-0.35	V
	ļ	$I_{C} = -30 \text{mA}, I_{B} = -3 \text{mA}$		-0.50	V
		$I_C = -50 \text{mA}, I_B = -5 \text{mA}$		-1	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =-10mA, I _B =-1mA		-0.75	V
,		$I_C = -20 \text{mA}, I_B = -2 \text{mA}$		-0.85	V
;		I _C =-30mA, I _B =-3mA		-0.90	V
Base Emitter On Voltage	V _{BE} (on)	$V_{CE} = -10V$, $I_{C} = -100mA$		-2	V
*Current Gain Bandwidth Product	f _T	$V_{CE} = -20V$, $I_{C} = -10mA$, $f = 20MHz$	40	200	MHz
Collector Base Capacitance	Ccb	$V_{CB} = -20V$; $I_E = 0$, $f = 1 MHz$,	6	pF
Emitter Base Capacitance	Ceb	$V_{EB} = -0.5V$, $I_C = 0$, $f = 1 MHz$		100	рF
Turn On Time	ton	V_{BE} (off)=-2V, V_{CC} =-100V		200	ns
		$I_{C} = -50 \text{mA}, I_{B}1 = -10 \text{mA}$			
Turn Off Time	toff	$V_{cc} = -100V$, $I_c = -50mA$		3.5	ns
,	,	$I_B 1 = I_B 2 = -10 \text{mA}$			

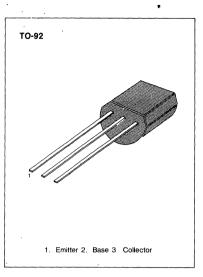
^{*} Pulse Test: PW≤300µs, Duty Cycle≤2%

HIGH VOLTAGE TRANSISTOR

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-300	V
Collector-Emitter Voltage	V _{CEO}	-300	V
Emitter-Base Voltage	V _{EBO}	-5	V
Collector Current	l _C	-500 ·	mA
Base Current	I _B	-250	mA
Collector Dissipation	Pc	0.625	w
Derate above 25°C		5	mW/°C
Junction Temperature	Tj ·	150	°C
Storage Temperature	Tstg	-55∼150	°C

[·] Refer to 2N6520 for graphs



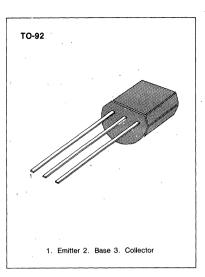
Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector Base Breakdown Voltag	BV _{CBO}	$I_{C} = -100 \mu A, I_{E} = 0$	300		V
*Collector Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -1 \text{ mA}, I_{B} = 0$	-300		V
Emitter Base Breakdown Voltage	BV _{EBO}	$I_E = -10\mu A$, $I_C = 0$	-5		· V
Collector Cutoff Current	I _{CBO}	$V_{CB} = -200V, I_{E} = 0$,	-50	nA
Emitter Cutoff Current	I _{EBO}	$V_{EB} = -4V, I_{C} = 0$		-50	nA
*DC Current Gain	h _{FE}	$V_{CE} = -10V, I_{C} = -1mA$	30		
		$V_{CE} = -10V$, $I_{C} = -10mA$	45	,	
		$V_{CE} = -10V$, $I_{C} = -30mA$	45	270	
		$V_{CE} = -10V$, $I_{C} = -50mA$	40	200	
·		$V_{CE} = -10V$, $I_{C} = -100mA$	20		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$i_C = -10$ mA, $i_B = -1$ mA		-0.30	V
_		$I_C = -20 \text{mA}, I_B = -2 \text{mA}$		-0.35	V
		$I_C = -30\text{mA}$, $I_B = -3\text{mA}$		-0.50	V
		$I_C = -50 \text{mA}$, $I_B = -5 \text{mA}$		-1	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_C = -10 \text{mA}, I_B = -1 \text{mA}$		-0.75	V
		$I_C = -20$ mA, $I_B = -2$ mA		-0.85	V
		$I_C = -30 \text{mA}$, $I_B = -3 \text{mA}$		-0.90	· V
Base Emitter On Voltage	V _{BE} (on)	$V_{CE} = -10V$, $I_{C} = -100mA$		-2	V
*Current Gain Bandwidth Product	f _T	$V_{CE} = -20V$, $I_{C} = -10mA$, $f = 20MHz$	40	200	MHz
Collector Base Capacitance	Ccb	$V_{CB} = -20V$, $I_E = 0$, $f = 1 MHz$		6	рF
Emitter Base Capacitance	Ceb ´	$V_{EB} = -0.5V$, $I_C = 0$, $f = 1 MHz$		100	pF
Turn On Time	ton	V_{BE} (off)=-2V, V_{CC} =-100V		200	ns
		$I_{C} = -50 \text{mA}, I_{B}1 = -10 \text{mA}$			
Turn Off Time	toff	$V_{cc} = -100V$, $I_c = -50mA$		3.5	ns
		$I_B 1 = I_B 2 = -10 \text{mA}$			

Pulse Test: PW≤300µs, Duty Cycle≤2%

HIGH VOLTAGE TRANSISTOR

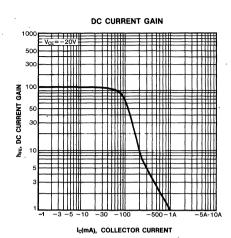
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

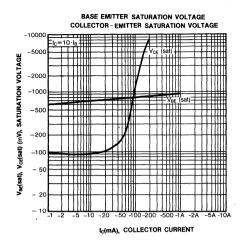
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-350	V
Collector-Emitter Voltage	V _{CEO}	-350	V
Emitter-Base Voltage	V _{EBO}	-5	V
Collector Current	lc	-500	mA
Base Current	l _B	-250	mA
Collector Dissipation	Pc	0.625	w
Derate above 25°C	,	5	mW/°C
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55∼150	°C

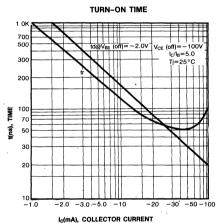


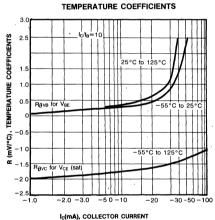
Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector Base Breakdown Voltag	BV _{CBO}	I _C =-100μΑ, I _E =0	-350		V
*Collector Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -1 \text{ mA}, I_{B} = 0$	-350		V
Emitter Base Breakdown Voltage	BV _{EBO}	$I_E = -10\mu A$, $I_C = 0$	-5		V
Collector Cutoff Current	I _{CBO}	$V_{CB} = -250V, I_E = 0$		-50	nA
Emitter Cutoff Current	I _{EBO}	$V_{EB} = -4V, I_{C} = 0$		-50	nA
*DC Current Gain	h _{FE}	$V_{CE} = -10V$, $I_{C} = -1mA$	20		
		$V_{CE} = -10V$, $I_{C} = -10mA$	30		
		$V_{CE} = -10V$, $I_{C} = -30mA$	30	200	
		$V_{CE} = -10V$, $I_{C} = -50mA$	20	200	
		$V_{CE} = -10V$, $I_{C} = -100mA$	15		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =-10mA, I _B =-1mA		-0.30	V
		I _C =-20mA, I _B =-2mA		-0.35	V
		$I_C = -30 \text{mA}, I_B = -3 \text{mA}$		-0.50	v
•		$I_C = -50 \text{mA}$, $I_B = -5 \text{mA}$		-1	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =-10mA, I _B =-1mA		-0.75	V
		$I_C = -20 \text{mA}$, $I_B = -2 \text{mA}$		-0.85	V
		I _C =-30mA, I _B =-3mA		-0.90	V
Base Emitter On Voltage	V _{BE} (on)	$V_{CE} = -10V$, $I_{C} = -100mA$		-2	V
*Current Gain Bandwidth Product	f _T	$V_{CE} = -20V$, $I_{C} = -10mA$, $f = 20MHz$	40	200	MHz
Collector Base Capacitance	Ccb	$V_{CB}=-20V$, $I_E=0$, $f=1MHz$		6	pF
Emitter Base Capacitance	Ceb	$V_{EB} = -0.5V$, $I_C = 0$, $f = 1 MHz$		100	рF
Turn On Time	ton	V_{BE} (off)=-2V, V_{CC} =-100V		200	ns
		$I_{C} = -50 \text{mA}, I_{B}1 = -10 \text{mA}$			
Turn Off Time	toff	$V_{cc}^{7} = -100V$, $I_{c} = -50mA$		3.5	ns
		$I_B 1 = I_B 2 = -10 \text{mA}$			

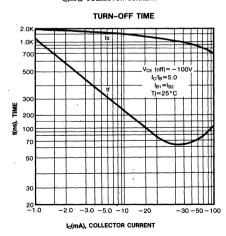
^{*} Pulse Test: PW≤300µs, Duty Cycle≤2%

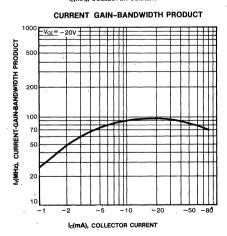


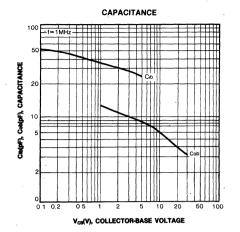












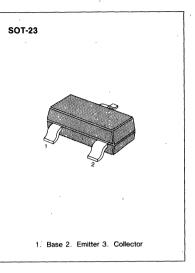
3

GENERAL PURPOSE TRANSISTOR

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	30	V
Collector-Emitter Voltage	V _{CEO}	20	V
Emitter-Base Voltage	V _{EBO}	5.0	V
Collector Current	l _C	100	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C

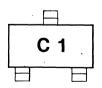
[•] Refer to MMBT5086 for graphs



ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =10μΑ. I _E =0	30		v
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C}=2.0mA, I_{B}=0$	20		V
Collector-Emitter Breakdown Voltage	BV _{CES}	$I_{C}=100\mu A, V_{EB}=0$	30		V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	5		. V
Collector Cutoff Current	I _{CBO}	$V_{CB}=20V$, $I_E=0$		100	nA
DC Current Gain	h _{FE}	$V_{CE}=5V$, $I_{C}=2.0mA$	120	260	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C}=10mA, I_{B}=0.5mA$		0.3	V
Base-Emitter On Voltage	V _{BE} (on)	I _C =2.0mA, V _{CE} =5V	0.6	0.75	V
Output Capacitance	Cob	$V_{CB}=10V$, $I_{E}=0$ f=1MHz		7	pF
Noise Figure	NF	$I_C=0.2\text{mA}, V_{CE}=5V$ $f=1\text{KHz}, R_S=2\text{K}\Omega$		10	dB

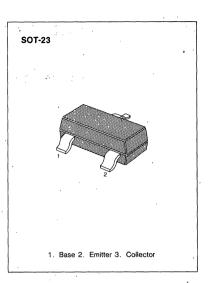
Marking



ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

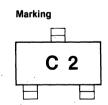
Characteristic	Sýmbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Storage Temperature	V _{CBO} V _{CEO} V _{EBO} I _C P _C Tstg	30 20 5.0 100 350 150	V V V mA mW

[•] Refer to MMBT5086 for graphs



ELECTRICAL CHARACTERISTICS (T_a=25°C)

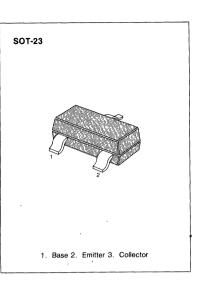
Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =10μA, I _E =0	30		V
Collector-Emitter Breakdown Voltage	BV_{CEO}	$I_C=2.0$ mA, $I_B=0$	20		V
Collector-Emitter Breakdown Voltage	BV _{CES}	I _C =100μA, V _{EB} =0	30		V
Emitter-Base Breakdown Voltage	BV_{EBO}	$I_E = 10 \mu A, I_C = 0$	5		V
Collector Cutoff Current	I _{CBO}	$V_{CB}=20V, I_{E}=0$		100	nA
DC Current Gain	h _{FE}	$V_{CE}=5V$, $I_{C}=2.0mA$	215	500	٠.
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C=10mA$, $I_B=0.5mA$		0.3	V
Base-Emitter On Voltage	V _{BE} (on)	I _C =2.0mA, V _{CE} =5V	0.6	0.75	V
Output Capacitance	Cob ,	V _{Cβ} =10V, I _E =0 f=1MHz	ē	7	pF
Noise Figure	NF	$I_{C}=0.2$ mA, $V_{CE}=5$ V $f=1$ KHz, $R_{S}=2$ K Ω		10	dB



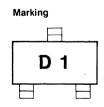
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	30	V
Collector-Emitter Voltage	V _{CEO}	20	V
Emitter-Base Voltage	V _{EBO}	5	. V
Collector Current	l _c	100	mA
Collector Dissipation	· Pc	350	mW
Storage Temperature	Tstg	150	°C
	1		1

[•] Refer to MMBT5088 for graphs



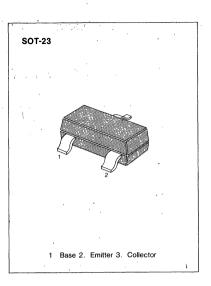
Symbol	Test Condition	Min	Max	Unit
BV _{CBO}	$I_{C} = 10 \mu A, I_{E} = 0$	30		V
BV _{CEO}	$I_C=2mA$, $I_B=0$	20		V
BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	5		V
h _{FE}	$V_{CE}=5V$, $I_{C}=2.0mA$	110	220	
V _{CE} (sat)	$I_{C} = 10 \text{mA}, I_{B} = 0.5 \text{mA}$		0.25	· V
V _{BE} (on)	I _C =2mA, V _{CE} =5V	0.55	0.7	V
Cob	$V_{CB}=10V, I_{E}=0$		4	pF
	f=1.0MHz			
NF	$I_C=0.2mA$, $V_{CE}=5V$		10	dB
	$R_s=2K\Omega$, $f=1KHz$			
	BV _{CBO} BV _{EO} BV _{EBO} h _{FE} V _{CE} (sat) V _{BE} (on) Cob	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$



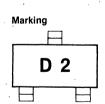
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	.30	V
Collector-Emitter Voltage Emitter-Base Voltage	V _{CEO} V _{EBO}	20 5	V
Collector Current	I _C	100	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C

[•] Refer to MMBT5088 for graphs



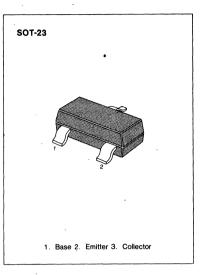
Characteristic	Symbol	Test Condition		Min	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C}=10\mu A, I_{E}=0$	1 .	30		V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C=2mA$, $I_B=0$		20		V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$. 5		V
DC Current Gain	h _{FE}	$V_{CE}=5V$, $I_{C}=2.0mA$	i	200	450	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C=10mA$, $I_B=0.5mA$			0.25	V
Base-Emitter On Voltage	V _{BE} (on)	I _C =2mA, V _{CE} =5V		0.55	0.7	V
Output Capacitance	Cob	$V_{CB} = 10V, I_{E} = 0$,		4	pF
		f=1.0MHz				
Noise Figure	NF	$I_C=0.2mA$, $V_{CE}=5V$			10	dB
		$R_s=2K\Omega$, $f=1KHz$		•		



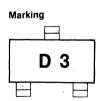
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage	V _{CBO} V _{CEO} V _{EBO}	30 20 5	V V
Collector Current Collector Dissipation Storage Temperature	Ic Pc Tstg	100 350 150	mA mW °C

[•] Refer to MMBT 5088 for graphs



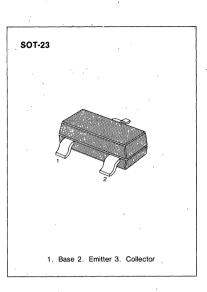
Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C}=10\mu A, I_{E}=0$	30		V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C=2mA$, $I_B=0$. 20		V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_{E}=10\mu A, I_{C}=0$	5		V
DC Current Gain	h _{FE}	$V_{CE}=5V$, $I_{C}=2.0mA$	420	800	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C}=10mA, I_{B}=0.5mA$		0.25	V
Base-Emitter On Voltage	V _{BE} (on)	I _C =2mA, V _{CE} =5V	0.55	0.7	V
Output Capacitance	Cob	$V_{CB} = 10V, I_E = 0$		4	pF
		f=1.0MHz		İ	
Noise Figure	NF	I _C =0.2mA, V _{CE} =5V	.]	10	dB
		$R_S=2K\Omega$, $f=1KHz$			



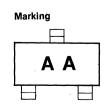
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage	V _{CBO}	32 32	V
Emitter-Base Voltage	V _{CEO}	5	V
Collector Current Collector Dissipation	l _c P _c	100 350	mA mW
Storage Temperature	Tstg	150	°C

Refer to MMBT3904 for graphs



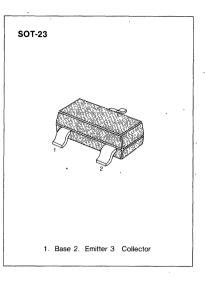
Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =2.0mA, I _B =0	32	4	V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 1.0 \mu A, I_C = 0$	5		V
Collector Cutoff Current		V _{CE} =32V, V _{BE} =0		20	nA
Emitter Cutoff Current	l _{EBO}	$V_{EB}=4V$, $I_{C}=0$		20	nA
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =2.0mA	120	220	
•		V _{CE} =5V, I _C =50mA	60		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =50mA, I _B =1.25mA		0.55	٧
		I _C =10mA, I _B =0.25mA		0.35	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_{\rm C}$ =50mA, $I_{\rm B}$ =1.25mA	0.7	1.05	V
. '	Ì	I _C =50mA, I _B =0.25mA	0.6	0.85	V
Base-Emitter On Voltage	V _{BE} (on)	$V_{CE} = 5V, I_{C} = 2.0 \text{mA}$	0.55	0.75	V
Current Gain-Bandwidth Product	f _T	I _C =_10mA, V _{CE} =5V f=1MHz	125		MHz
Output Capacitance	Cob	$V_{CB} = 10V, I_{E} = 0$ f = 1.0MHz		4.5	pF
Noise Figure	NF .	$I_C=0.2$ mA, $V_{CE}=5$ V R _S =2K Ω , f=1KHz		6	dB
Turn On Time	ton	I _C =10mA, I _{B1} =1mA		150	ns
Turn Off Time	toff	$V_{BB}=3.6V, I_{B2}=1 \text{ mA}$ $R_1=R_2=5K\Omega, R_L=990\Omega$		800	ns



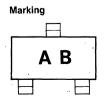
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	32	V
Collector-Emitter Voltage	V _{CEO}	32	V .
Emitter-Base Voltage	V _{EBO}	5	ν
Collector Current	l _C	100	mÀ
Collector Dissipation	Pc	350	mW ·
Storage Temperature	Tstg	150	°C

[•] Refer to MMBT3904 for graphs



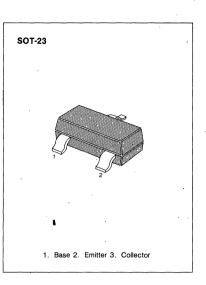
Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =2.0mA, I _B =0	32		٧.
Emitter-Base Breakdown Voltage	BV _{FBO}	$I_E = 1.0 \mu A, I_C = 0$	5		V
Collector Cutoff Current	I _{CES}	V _{CE} =32V, V _{BE} =0		20	nA
Emitter Cutoff Current	1 _{EBO}	$V_{EB}=4V$, $I_{C}=0$		20	nA
DC Current Gain	h _{FE}	$V_{CE}=5V$, $I_{C}=10\mu A$	20		
		$V_{CF}=5V$, $I_{C}=2.0mA$	180	310	
	,	$V_{CE}=1V$, $I_{C}=50mA$	70		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =50mA, I _B =1.25mA		0.55	V
•	,	$I_{C}=10mA$, $I_{B}=0.25mA$		0.35	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_c = 50 \text{mA}$. $I_B = 1.25 \text{mA}$	0.7	1.05	V
		$I_{C}=50mA, I_{B}=0.25mA$	0.6	0.85	V
Base-Emitter On Voltage	√ _{BE} (on)	$V_{CE}=5V$, $I_{C}=2.0mA$	0.55	0.75	V
Current Gain-Bandwidth Product	f⊤	I _C =10mA, V _{CE} =5V f=1 MHz	125	,	MHz
Output Capacitance	Cob	$V_{CB}=10V$, $I_{E}=0$ f=1.0MHz	,	4.5	pF
Noise Figure	NF	$I_C=0.2$ mA, $V_{CE}=5$ V $R_S'=2$ K Ω , $f=1$ KHz		6	dB
Turn On Time	ton	I _C =10mA, I _{R1} =1mA		150	ns
Turn Off Time	toff .	$V_{BB}=3.6V, I_{B2}=1 \text{mA}$ $R_1=R_2=5K\Omega, R_L=990\Omega$		800	ns



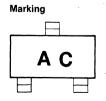
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	32	V
Collector-Emitter Voltage	V _{CEO}	32	V
Emitter-Base Voltage	V _{EBO}	5	V
Collector Current	l _c	100	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C

[•] Refer to MMBT3904 for graphs



Symbol	Test Condition	Min	Max	Unit
BV _{CEO}	I _C =2.0mA, I _B =0	32		٧
BV_{FBO}	I _E =1.0μA, I _C =0	`5		٧
I _{CES}	V _{CE} =32V. V _{BE} =0		20	nA
1 _{EBO}	V _{EB} =4V, I _C =0		20	nA
h _{FE}	$V_{CE} = 5V, I_{C} = 10\mu A$	40		
	$V_{CF}=5V$. $I_C=2.0mA$	250	460	
	$V_{CE}=1V$, $I_{C}=50mA$	90		
V _{CE} (sat)	I _C =50mA, I _B =1.25mA		, 0.55	V
	I _C =10mA, I _B =0.25mA		0.35	V
V _{BE} (sat)	I _c =50mA, I _B =1.25mA	0.7	1.05	V
	I _C =50mA, I _B =0.25mA	0.6	0.85	V
V _{BE} (on)	$V_{CE}=5V$, $I_{C}=2.0mA$	0.55	0.75	V
f⊤	In=10mA, V _{CE} =5V	125		MHz
	f=1MHz			
Cob	$V_{CB}=10V$, $I_E=0$		4.5	pF
	f=1.0MHz			
NF	I _C =0.2mA, V _{CE} =5V		6	dB
	$R_s=2K\Omega$, $f=1KHz$			
ton _.	$I_C=10mA$, $I_{B1}=1mA$		150	ns
toff	$V_{BB}=3.6V, I_{B2}=1 mA$		800	ns
	$R_1=R_2=5K\Omega$, $R_L=990\Omega$			
	BV _{CEO} BV _{FBO} I _{CES} I _{EBO} h _{FE} V _{CE} (sat) V _{BE} (sat) V _{BE} (on) f _T Cob NF ton	$\begin{array}{llllllllllllllllllllllllllllllllllll$	$\begin{array}{llllllllllllllllllllllllllllllllllll$	$\begin{array}{llllllllllllllllllllllllllllllllllll$





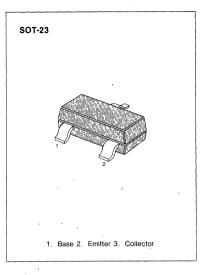
3

GENERAL PURPOSE TRANSISTOR

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	32	V
Collector-Emitter Voltage	V _{CEO}	32	V
Emitter-Base Voltage	V _{EBO}	5	V
Collector Current	l _c	. 100	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg.	150	°C

[•] Refer to MMBT3904 for graphs



ELECTRICAL CHARACTERISTICS (Ta=25°C)

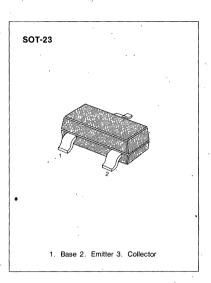
Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =2.0mA, I _B =0	32		V
Emitter-Base Breakdown Voltage	BV _{FBO}	$I_E = 1.0 \mu A$, $I_C = 0$	5		V
Collector Cutoff Current	ICES	V _{CE} =32V V _{BE} =0		20	nA
Emitter Cutoff Current	I _{EBO}	V _{EB} =4V, I _C =0		20	nA
DC Current Gain	h _{FE}	$V_{CE} = 5V, I_{C} = 10\mu A$	100		
		$V_{CE}=5V$, $I_{C}=2.0mA$	380	630	
		$V_{CE}=1V$, $I_{C}=50mA$	100		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =50mA, I _B =1.25mA		0.55	V
•		I _C =10mA, I _B =0.25mA		0.35	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	k=50mA. l₀=1 25mA	0.7	1.05	V
		I_{C} =50mA, I_{B} =0 25mA	0.6	0.85	V
Base-Emitter On Voltage	V _{B£} (on)	V _{CE} =5V, I _G =2.0mA	0.55	0.75	V
Current Gain-Bandwidth Product	f _T	$I_{C}=10\text{mA}, V_{CE}=5V$	125		MHz
Output Capacitance	Cob	f=1MHz $V_{CB}=10V, I_{E}=0$ f=1.0MHz		4.5	pF
Noise Figure	NF	I_c =0.2mA, V_{CE} =5V R_s =2K Ω , f=1KHz		. 6	dB
Turn On Time	ton	$I_{C}=10mA, I_{B1}=1mA$		150 ·	· ns
Turn Off Time	toff .	V_{BB} =3.6V, I_{B2} =1mA R ₁ =R ₂ =5K Ω , R _L =990 Ω		800	ns

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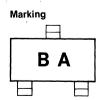
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	. 32	V
Collector-Emitter Voltage	Vceo	32	V
Emitter-Base Voltage	V _{EBO}	5.0	V
Collector Current	lc.	100	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C

[•] Refer to MMBT5086 for graphs



Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =2mA, I _B =0	32	·	٧
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_{E}=1\mu A, I_{C}=0$	5		٠٧
Collector Cutoff Current	ICES	V _{CE} =32V, V _{BE} =0		. 20	nA
DC Current Gain	h _{FE}	$V_{CF}=5V. I_{C}=2mA$	120	220	
		V _{CE} =1V, I _C =50mA	60	1	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =0.25mA	1	0.25	V
		I _C =50mA, I _B =1.25mA		0.55	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =10mA, I _B =0.25mA	0.6	0.85	V
		I _C =50mA, I _B =1.25mA	0.68	1.05	V
Base-Emitter On Voltage	V _{BE} (on)	$I_C=2mA$, $V_{CF}=5V$	0.6	. 0.75	V
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1MHz		6	pF
Noise Figure	NF	$I_c=0.2\text{mA}, V_{ce}=5\text{V}$		6	dB
		$R_S=2K\Omega$, $f=1KHz$			
Turn On Time	ton	I _C =10mA, I _{B1} =1mA		150	ns
Turn Off Time	toff	$I_{B2} = 1 \text{ mA}, V_{BB} = 3.6 \text{ V}$ $R_L = 990 \Omega$		800	ns
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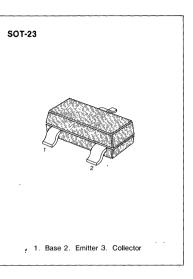
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GENERAL PURPOSE TRANSISTOR

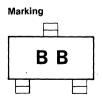
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	32	V
Collector-Emitter Voltage	V _{CEO}	32	V
Emitter-Base Voltage	V _{EBO}	5.0	V
Collector Current	Ic	100	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C

[•] Refer to MMBT5086 for graphs



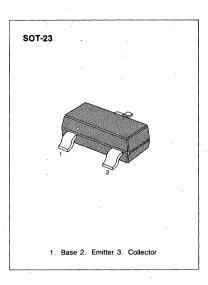
Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C=2\text{mA}, I_B=0$	32		٧
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_{E}=1\mu A, I_{C}=0$	5		V
Collector Cutoff Current	I _{CES}	V _{CE} =32V, V _{BE} =0		20	nΑ
DC Current Gain	h _{FE}	$V_{CE} = 5V, I_{C} = 10\mu A$	20		
		$V_{CE}=5V$, $I_{C}=2mA$	140	310	
		$V_{CE}=1V$, $I_{C}=50mA$	80	·	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 10 \text{mA}, I_{B} = 0.25 \text{mA}$	1	0.25	V
F.		I _C =50mA, I _B =1.25mA	}	0.55	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =10mA, I _B =0.25mA	0.6	0.85	V
-		$I_{\rm C}$ =50mA, $I_{\rm B}$ =1.25mA	0.68	1.05	V
Base-Emitter On Voltage	V _{BE} (on)	I _C =2mA, V _{CF} =5V	0.6	0.75	V
Output Capacitance	Cob	$V_{CB}=10V$ $I_{E}=0$ f=1MHz		6	pF
Noise Figure	NF	$I_C=0.2$ mA, $V_{CE}=5$ V $R_S=2$ K Ω , $f=1$ KHz	j	6	dB
Turn On Time	ton	I _C =10mA, I _{B1} =1mA	}	150	ns '
Turn Off Time	toff	$I_{B2} = 1 \text{ mA}, V_{BB} = 3.6 \text{ V}$ $R_L = 990 \Omega$		800	ns



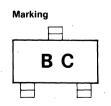
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	Voro	32	Ÿ
Collector-Emitter Voltage	·V _{CEO}	32	V
Emitter-Base Voltage	V _{EBO}	´. 5.0	V
Collector Current	l _C	100	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C

[•] Refer to MMBT5086 for graphs



Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C=2mA$, $I_B=0$	32		V
Emitter-Base Breakdown Voltage	BVEBO	$I_E = 1 \mu A, I_C = 0$	5		V .
Collector Cutoff Current	I _{CES}	$V_{CE} = 32V, V_{BE} = 0$		20	nA
DC Current Gain	h _{FE}	$V_{CE} = 5V, I_{C} = 10 \mu A$	40	,	
,	ì	$V_{CF}=5V.I_{C}=2mA$	250	460	
•	Ì	$V_{CE}=1V$, $I_{C}=50mA$	100		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 10 \text{mA}, I_{B} = 0.25 \text{mA}$		0.25	V
,		I _C =50mA, I _B =1.25mA		0.55	V
Base-Emitter Saturation Voltage	V _{BE} (sat).	I _C =10mA, I _B =0.25mA	0.6	0.85	# V
-		I _C =50mA, I _B =1.25mA	0.68	1.05	V
Base-Emitter On Voltage	V _{BE} (on)	I _C =2mA, V _{CF} =5V	. 0.6	0.75	V .
Output Capacitance	Cob	V _{CB} =10V, I _F =0	1	6	pF
		f=1MHz			
Noise Figure	NF	I _C =0.2mA, V _{CE} =5V		6	dB
-		$R_s = 2K\Omega$, $f = 1KHz$			
Turn On Time	ton '	$I_{C} = 10 \text{mA}, I_{B1} = 1 \text{mA}$		150	ns
Turn Off Time	toff	$I_{B2}=1 \text{ mA}, V_{BB}=3.6 \text{ V}$		800	ns
, · · · · ·]	$R_1 = 990\Omega$			



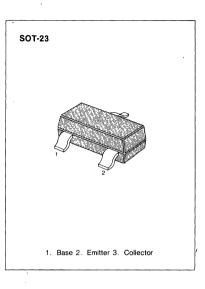
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GENERAL PURPOSE TRANSISTOR

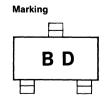
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	32 32	V
Collector-Emitter Voltage Emitter-Base Voltage	V ^{EBO}	5.0	V
Collector Current	l _c	100	mA
Collector Dissipation Storage Temperature	P _c Tstg	350 150	°C

[•] Refer to MMBT5086 for graphs



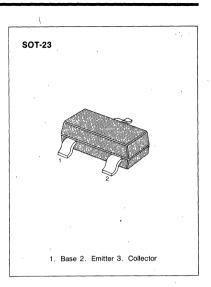
Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-EmitterBreakdown Voltage	BV _{CEO}	I _C =2mA, I _B =0	32		v
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 1 \mu A, I_C = 0$	5		V
Collector Cutoff Current	I _{CES}	$V_{CE} = 32V, V_{BE} = 0$		20	nA
DC Current Gain	h _{FE}	$V_{CE} = 5V, I_{C} = 10\mu A$	100		
		$V_{CF}=5V$, $I_{C}=2mA$	380	630	
		V _{CE} =1V, I _C =50mA	100		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =0.25mA		0.25	V
		I _C =50mA, I _B =1.25mA		0.55	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_{C}=10mA, I_{B}=0.25mA$	0.6	0.85	V
		I _C =50mA, I _B =1.25mA	0.68	1.05	V
Base-Emitter On Voltage	V _{BE} (on)	I _C =2mA, V _{CE} =5V	0.6	0.75	V
Output Capacitance	Cob	V _{CB} =10V, I _E =0		6	pF
		f=1MHz /			
Noise Figure	NF	I _C =0.2mA, V _{CE} =5V		6	dB
_		$R_s = 2K\Omega$, $f = 1KHz$			
Turn On Time	t on	I _C =10mA, I _{B1} =1mA		150	ns
Turn Off Time	toff	$I_{B2} = 1 \text{ mA}, V_{BB} = 3.6 \text{ V}$		800	ns
		R _L =990 Ω			



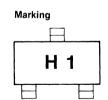
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Storage Temperature	V _{CEO} V _{EBO} I _C P _C Tstg	45 5 100 350 150	V V mA mW °C

[•] Refer to MMBT5086 for graphs



Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =2.0mA, I _B =0	45		V
Collector-Emitter Breakdown Voltage	BV _{CES}	$I_{C} = 100 \mu A, V_{EB} = 0$	50		· v
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	5		V
Collector Cutoff Current .	I _{CBO}	$V_{CB} = 20V, I_E = 0$		100	nA
DC Current Gain	h _{FE}	$V_{CE}=5V$, $I_{C}=2.0mA$	120	260	·
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C=10mA$, $I_B=0.5mA$		0.3	V
Base-Emitter On Voltage	V _{BE} (on)	$I_C=2.0mA$, $V_{CE}=5V$	0.6	0.75	l v
Output Capacitance	Cob	$V_{CB} = 10V, I_{E} = 0$		7.0	· pF
		f=1.0MHz	1		
Noise Figure	NF	$I_{C}=0.2mA, V_{CE}=5.0V$		10	dB
	}	$R_S=2.0K\Omega$, $f=1.0KHz$			
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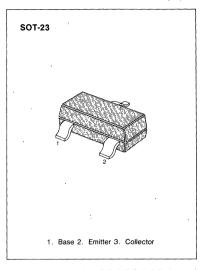
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GENERAL PURPOSE TRANSISTOR

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Storage Temperature	V _{CEO} V _{EBO} I _C P _C Tstg	45 5 100 350 150	V V mA mW

[•] Refer to MMBT5086 for graphs



ELECTRICAL CHARACTERISTICS (Ta=25°C)

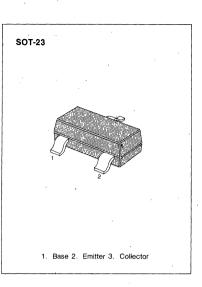
Symbol	Test Condition	Min	Max	Unit
BV _{CEO}	$I_{C}=2.0$ mA, $I_{B}=0$	45		V -
BV _{CES}	$I_C = 100 \mu A, V_{EB} = 0$	50		V
BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	5		V
1 _{CBO}	$V_{CB} = 20V, I_{E} = 0$		100	nA
h _{FE}	$V_{CE}=5V$, $I_{C}=2.0mA$	215	500	
V _{CE} (sat)	$I_{C}=10mA, I_{B}=0.5mA$		0.3	· v
V _{BE} (on)	$I_C=2.0mA$, $V_{CE}=5V$	0.6	0.75	V.
Cob	V _{CB} =10V, I _E =0		7.0	pF
	f=1.0MHz			3
NF	$I_{C}=0.2mA, V_{CE}=5.0V$		10	dB
	$R_S=2.0K\Omega$, $f=1.0KHz$	1		1
	BV _{CEO} BV _{CES} BV _{EBO} I _{CBO} h _{FE} V _{CE} (sat) V _{BE} (on) Cob	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$

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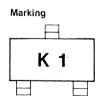
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Storage Temperature	V _{CBO} V _{CEO} V _{EBO} Ic P _C Tstg	50 45 5 100 350 150	V V V mA mW

[•] Refer to MMBT5088 for graphs



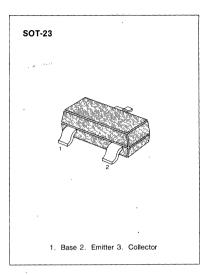
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_C = 10\mu A, I_E = 0$	50			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C=2mA$, $I_B=0$	45			V
Collector-Emitter Breakdown Voltage	BV _{CES}	$I_C=2mA$, $V_{EB}=0$	45			V
Emitter-Base Breakdown Voltage	BV _{EBO} .	$I_E = 10 \mu A, I_C = 0$	5			V
Collector Cutoff Current	I _{CBO}	$V_{CB} = 20V, I_E = 0$			100	nA
DC Current Gain	h _{FE}	$V_{CE}=5V$, $I_{C}=2mA$	110		220	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =0.5mA		l	0.25	V
		$I_C=50mA$, $I_B=2.5mA$		0.21		V
Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_C=50$ mA, $I_B=2.5$ mA		0.85		V
Base-Emitter On Voltage	V _{BE} (on)	I _C =2mA, V _{CE} =5V	0.6		0.75	V
Current Gain-Bandwidth Product	f⊤	$I_C = 10 \text{mA}, V_{CE} = 5 \text{V}$		300		MHz
		f=35MHz			-t	,
Output Capacitance	Cob	V _{CB} =10V, I _E =0			4	рF
		f=1MHz				
Noise Figure	NF	I _C =0.2mA, V _{CE} =5V			10	dB
		$R_S=2K\Omega$, $f=1KHz$				



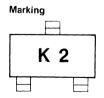
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Storage Temperature	V _{CBO} V _{CEO} V _{EBO} I _C P _C Tstg	50 45 5 100 350 150	V V V mA mW

[•] Refer to MMBT5088 for graphs



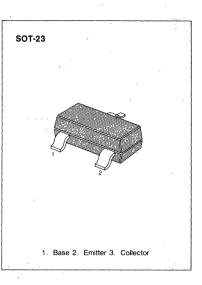
Symbol	Test Condition	Min	Тур	Max	Unit
BV _{CBO}	$I_{C}=10\mu A, I_{E}=0$	50			V
BV _{CEO}	$I_c=2mA$, $I_B=0$	45			V
BV _{CES}	I _C =2mA, V _{EB} =0	45			V
BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	5			V
I _{CBO}	V _{CB} =20V, I _E =0			100	nA
h _{FE}	$V_{CE}=5V$, $I_{C}=2mA$	200		450	
V _{CE} (sat)	$I_{C} = 10 \text{mA}, I_{B} = 0.5 \text{mA}$			0.25	V
	I _C =50mA, I _B =2.5mA		0.21		V
V _{BE} (sat)	I _C =50mA, I _B =2.5mA		0.85		V
V _{BE} (on)	I _C =2mA, V _{CE} =5V	0.6		0.75	V
f⊤	I _C =10mA, V _{CE} =5V		300		MHz
	f=35MHz				
Cob	$V_{CB}=10V, I_{E}=0$			4	pF
ļ	f=1MHz				
NF	I _C =0.2mA, V _{CE} =5V	1		10	dB
	$R_S=2K\Omega$, $f=1KHz$				
	BV _{CBO} BV _{CEO} BV _{CES} BV _{EBO} I _{CBO} h _{FE} V _{CE} (sat) V _{BE} (on) f _T Cob	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$



ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	45	V
Collector-Emitter Voltage	V _{CEO}	45	V
Emitter-Base Voltage	V_{EBO}	5	V
Collector Current	l _C	200	mA
Collector Dissipation	Pc	350	mW-
Storage Temperature	Tstg	150	°C

[•] Refer to MMBT5088 for graphs



ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CEO} .	$I_{c}=2\text{mA}, I_{B}=0$	45		V
Emitter-Base Breakdown Voltage	BV_{EBO}	$I_E = 1 \mu A, I_C = 0$. 5		·V
Collector Cutoff Current	I _{CES}	V _{CE} =32V, V _{BE} =0		20	nA ·
Emitter Cutoff Current	I _{EBO}	V _{EB} =4V, I _C =0		20	nA
DC Current Gain	h _{FE}	V _{CF} =5V, I _C =2mA	120	220	
•		V _{CE} =1V, I _C =50mA	60		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =0.25mA		0.35	V
I .		I_{C} =50mA, I_{B} =1 25mA		0.55	·V
Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =50mA, I _B =0.25mA	0.6	0.85	V
		I _C =50mA, I _B =1.25mA	0.7	1.05	V
Base-Emitter On Voltage	V _{BE} (on)	I _C =2mA, V _{CE} =5V	0.55	0.75	V
Current Gain-Bandwidth Product	f _t .	V _{CE} =5V, I _C =10mA f=100MHz	125		MHz
Output Capacitance	Cob	V _{CB} =10V, I _E =0		4.5	pF
Noise Figure	NF	f=1MHz $I_{c}=0.2$ mA, $V_{ce}=5$ V $f=1$ KHz, $R_{s}=2$ K Ω		. 6	dB
Turn On Time	ton	$I_{c}=10\text{mA}, I_{B1}=1\text{mA}$		150	ns
Turn Off Time	toff	$I_{B2}=1 \text{ mA}, V_{BB}=3.6V$ $R_1=990\Omega, R_1=R_2=5K\Omega$		800	ns

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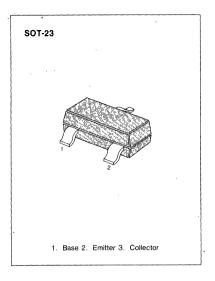
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GENERAL PURPOSE TRANSISTOR

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Storage Temperature	V _{CBO} V _{CEO} V _{EBO} I _C P _C Tstg	45 45 5 200 350 150	V V V mA mW

[•] Refer to MMBT3904 for graphs



ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =2.0mA, I _B =0	45		٧
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 1.0 \mu A$, $I_C = 0$	5	·	V
Collector Cutoff Current	Ices	V _{CE} =32V V _{BE} =0		20	nA
Emitter Cutoff Current	I _{EBO}	$V_{EB}=4V$, $I_{C}=0$		20	nA
DC Current Gain	h _{FE}	$V_{CE} = 5V, I_{C} = 10\mu A$	20		
•		$V_{CF}=5V$, $I_{C}=2.0mA$	180	310	
		$V_{CE}=1V$, $I_{C}=50mA$	70		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C}=10mA, I_{B}=0.25mA$		0.35	V
		I _C =50mA, I _B =1.25mA		0.55	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =50mA, I _B =0.25mA	0.6	0.85	V
		I _C =50mA, I _B =1.25mA	0.7	1.05	V
Base-Emitter On Voltage	V _{BE} (on)	I _C =2.0mA, V _{CE} =5V	0.55	0.75	V
Current Gain-Bandwidth Product	f _T .	$I_C=10$ mA, $V_{CE}=5$ V f=1MHz	125		MHz
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=100 MHz		4.5	pF
Noise Figure	NF	$V_{CE}=5V$, $I_{C}=0.2mA$ $R_{S}=2K\Omega$, $f=1KHz$		6	dB
Turn On Time	ťon	$I_{C}=10mA, I_{B1}=1.0mA$		150	ns
Turn Off Time	t H	$V_{BB}=3.6V, I_{B2}=1.0mA$ $R_1=R_2=5K\Omega, R_L=990\Omega$		800	ns

Marking

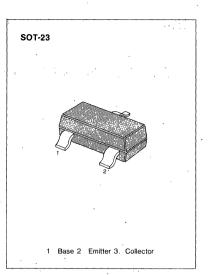




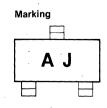
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	45	V
Collector-Emitter Voltage	V _{CEO}	· 45	V
Emitter-Base Voltage	V _{EBO}	5	٧
Collector Current	lc	200	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C

[•] Refer to MMBT3904 for graphs



Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =2.0mA, I _B =0	45	,	V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 1.0 \mu A$, $I_C = 0$	5		V
Collector Cutoff Current	ICES	V _{CE} =32V V _{BE} =0		20	nA
Emitter Cutoff Current	I _{EBO}	V _{EB} =4V, I _C =0		20	nA
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =10μA	40		
		$V_{c1} = 5V. I_{c} = 2.0 \text{m/A}$	250	460	
		$V_{CE} = 1V$, $I_C = 50mA$. 90		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_c = 10 \text{mA}, I_B = 0.25 \text{mA}$		0.35	V
•		I _C =50mA, I _B =1.25mA		0.55	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_{C} = 50 \text{mA}, I_{B} = 0.25 \text{mA}$	0.6	0.85	V
		$I_{c} = 50 \text{mA}, I_{B} = 1.25 \text{mA}$	0.7	1.05	. V
Base-Emitter On Voltage	V _{BE} (on)	I _C =2.0mA, V _{CE} =5V	0.55	0.75	· V
Current Gain-Bandwidth Product	f _T .	I _C =10mA, V _{CE} =5V f=100MHz	125		MHz
Output Capacitance	Cob	$V_{CB}=10V$, $I_{E}=0$ f=1MHz		4.5	pF
Noise Figure	NF	$V_{CE}=5V$, $I_{C}=0.2mA$ $R_{S}=2K\Omega$, $f=1KHz$		6	. dB
Turn On Time	ton	$I_{C} = 10mA, I_{B1} = 1.0mA$		150	ns
Turn Off Time	toff	$V_{BB} = 3.6V, I_{B2} = 1.0 \text{mA}$ $R_1 = R_2 = 5 \text{K} \Omega, R_L = 990 \Omega$		800	ns



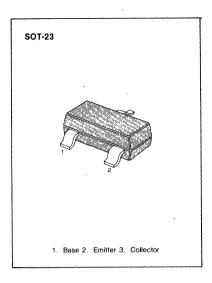
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GENERAL PURPOSE TRANSISTOR

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	45	V
Collector-Emitter Voltage	V _{CEO}	45	V
Emitter-Base Voltage	V _{EBO}	5	V
Collector Current	l _C	200	m/A
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C

[•] Refer to MMBT3904 for graphs



ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C=2.0$ mA, $I_E=0$	45		V
Emitter-Base Breakdown Voltage	BV _{EBO}	I _E =1.0μA, I _C =0	5		V
Collector Cutoff Current	I _{CES}	V _{CE} =32V V _{BL} =0		20	nΑ
Emitter Cutoff Current	I _{EBO}	$V_{EB} = 4V$. $I_{C} = 0$		20	nA
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =.10μA	100		
		$V_{CE}=5V$, $I_{C}=2.0mA$	380	630	
		V _{CE} =1V, I _C =50mA	100		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =0.25mA		0.35	V
		I _C =50mA, I _B =1.25mA		0.55	, A
Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =50mA, I _B =0.25mA	0.6	0.85	V
		I _C =50mA, I _B =1.25mA	0.7	1.05	٧
Base-Emitter On Voltage	V _{BE} (on)	I _C =2.0mA, V _{CE} =5V	0.55	0.75	٧
Current Gain-Bandwidth Product	f _T	I _C =10mA, V _{CE} =5V f=100MHz	125		MHz '
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1MHz		4.5	pF
Noise Figure	NF	V_{CE} =5V, I_{C} =0.2mA R_{S} =2K Ω , f=1KHz	•	6	dB
Turn On Time	ton	I _C =10mA, I _{B1} =1.0mA	•	150	ns
Turn Off Time	toff	V_{BB} =3.6V, I_{B2} =1.0mA . R_1 = R_2 =5K Ω , R_L =990 Ω		800	ns

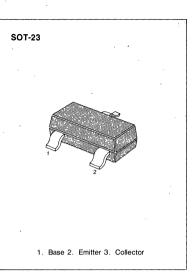
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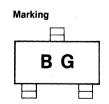
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage	V _{CBO}	.45 45	V
Emitter-Base Voltage	V _{EBO}	5.0	V
Collector Current	l _c	100	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C

[•] Refer to MMBT5086 for graphs



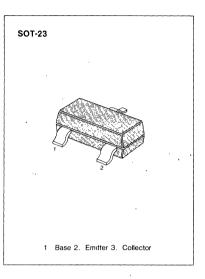
Characteristic	Symbol	Test Condition	Min .	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =2mA, I _B =0	45		٧
Emitter-Base Saturation Voltage	BV _{EBO}	$I_{E}=1\mu A, I_{C}=0$	5		V
Collector Cutoff Current	Ices	V _{CE} =32V, V _{BE} =0		20	nA
DC Current Gain	h _{FE}	$V_{CE}=5V$, $I_{C}=2mA$	120	220	
		$V_{CE}=1V$, $I_{C}=50mA$	60		,
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =0.25mA		0.25	٧
		I _C =50mA, I _B =1.25mA		0.55	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =10mA, I _B =0.25mA	0.6	0.85	V
		I _C =50mA, I _B =1.25mA	0.68	1.05	٧
Base-Emitter On Voltage	V _{BE} (on)	I _C =2mA, V _{CF} =5V	0.6	0.75	٧
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=1MHz		6	pF
Noise Figure	NF	I _C =0.2mA, V _{CE} =5V		6	dB
•		$R_s=2K\Omega$, $f=1KHz$	Į.		
Turn On Time	ton	$I_C=10mA$, $I_{B1}=1mA$		150	ns
Turn Off Time	toff	$I_{B2} = 1 \text{ mA}, V_{BB} = 3.6 \text{ V}$ $R_L = 990 \Omega$		800	ns
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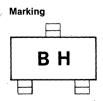
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Storage Temperature	VCBO VCEO VEBO IC PC Tstg	45 45 5 100 350 150	V V V mA mW

[•] Refer to MMBT5086 for graphs



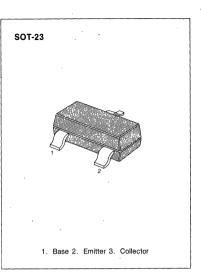
Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C=2mA$, $I_B=0$	45		٧
Emitter-Base Breakdown Voltage	· BV _{EBO}	$I_{\rm F} = 1 \mu A$, $I_{\rm C} = 0$	5		V
Collector Cutoff Current	I _{CES}	V _{CE} =32V, V _{BE} =0		20	nA
DC Current Gain	h _{FE}	$V_{CE} = 5V, I_{C} = 10\mu A$	30		
		$V_{CE} = 5V$. $I_C = 2mA$	140	310	
,		$V_{CE}=1V$, $I_{C}=50mA$	80		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 1 \text{ OmA}, I_{B} = 0.25 \text{mA}$		0.25	٧.
		I _C =50mA, I _B =1.25mA		0.55	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_{C}=10mA, I_{B}=0.25mA$	0.6	0.85	V
		I _C =50mA, I _B =1.25mA	0.68	1.05	V
Base-Emitter On Voltage	V _{BE} (on)	I _C =2mA, V _{CF} =5V	0.6	0.75	V
Output Capacitance	Cob	$V_{CB} = 10V, I_{E} = 0$		6	pF
		f=1MHz	-		
Noise Figure	NF	I _C =0.2mA, V _{CE} =5V		6	dB
		f=1KHz, R _s =2KΩ			
Turn On Time	ton	I _C =10mA, I _{B1} =1mA		150	ns
Turn Off Time	toff	I _{B2} =1mA, V _{BB} =3.6V		800	ns
,		R _L =990Ω			



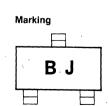
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Storage Temperature	V _{CBO} V _{CEO} V _{EBO} I _C P _C Tstq	45 45 5 100 350 150	V V MA mW

[•] Refer to MMBT5086 for graphs



Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Emitter Breakdown Voltage	. BV _{CEO}	I _C =2mA, I _B =0	45	· ·	V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_F = 1 \mu A$. $I_C = 0$	5		V
Collector Cutoff Current	Ices	$V_{CE} = 32V, V_{BE} = 0$		20	. nA
DC Current Gain	h _{FE}	$V_{CE} = 5V, I_{C} = 10\mu A$	40		
		$V_{CI} = 5V. I_{C} = 2mA$	250	460	
•		$V_{CE}=1V$, $I_{C}=50mA$	100		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =0.25mA		0.25	V
		$I_C=50$ mA, $I_B=1.25$ mA		0.55	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =10mA, I _B =0.25mA	0.6	0.85	V
		I _C =50mA, I _B =1.25mA	0.68	1.05	V
Base-Emitter On Voltage	V _{BE} (on)	$I_c=2mA$, $V_{cf}=5V$	0.6	0.75	V
Output Capacitance	Cob	$V_{CB}=10V$. $I_E=0$		6	pF
		f=1MHz			
Noise Figure	NF	I _C =0.2mA, V _{CE} =5V		6	dB
		f=1KHz, R _s =2KΩ·			
Turn On Time	ton	$I_C=10mA$, $I_{B1}=1mA$		150	ns
Turn Off Time	toff	I _{B2} =1mA, V _{BB} =3.6V		800	ns
•		R _L =990Ω			



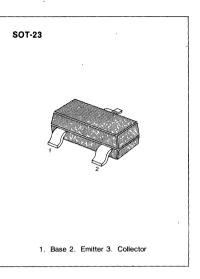
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GENERAL PURPOSE TRANSISTOR

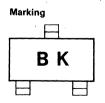
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	45	V
Collector-Emitter Voltage	V _{CEO}	45	V
Emitter-Base Voltage	V _{EBO}	5.0	V
Collector Current	l _c	100	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C

[•] Refer to MMBT5086 for graphs



Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C=2mA$, $I_B=0$	45		V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 1 \mu A, I_C = 0$	5		V
Collector Cutoff Current	Ices	V _{CE} =32V, V _{BE} =0		20	nA
DC Current Gain	h _{FE}	$V_{CE}=5V$, $I_C=10\mu A$	100		
		$V_{CE}=5V$, $I_{C}=2mA$	380	630	
		$V_{CE}=IV, I_{C}=50mA$	110		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C}=10mA, I_{B}=0.25mA$		0.25	V
		I _C =50mA, I _B =1.25mA		0.55	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =10mA, I _B =0.25mA	0.6	0.85	V
		I _C =50mA, I _B =1.25mA	0.68	1.05	V
Base-Emitter On Voltage	V _{BE} (on)	I _C =2mA, V _{CF} =5V	0.6	0.75	V
Output Capacitance	Cob	$V_{CB} = 10V$, $I_{E} = 0$ f = 1MHz		6	pF
Noise Figure .	NF	$I_C=0.2$ mA, $V_{CE}=5$ V $R_S=2$ K Ω , $f=1$ KHz		6	dB
Turn On Time	ton	$I_{C} = 10 \text{mA}, I_{B1} = 1 \text{mA}$		150	ns
Turn Off Time	toff	$I_{B2}=1$ mA, $V_{BB}=3.6$ V $R_{L}=990$ Ω		800	ns

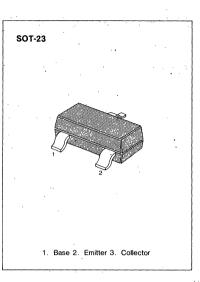


DRIVER TRANSISTOR

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current	V _{CBO} V _{CEO} V _{EBO}	50 45 5 50	V V V mA
Collector Dissipation Storage Temperature	P _C Tstg	350 150	mW °C

[•] Refer to MMBT5086 for graphs



Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =100μA, I _E =0	50		V .
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =1.0mA, I _B =0	45		V
Emitter-Base Breakdown Voltage	BV _{EBO}	I _E =10μA, I _C =0	5		V
Collector Cutoff Current	Ісво	V _{CB} =40V, I _E =0	•	50	nA
Emitter Cutoff Current	I _{EBO}	$V_{EB} = 5.0V, I_{C} = 0$		50	nA
DC Current Gain	h _{FE}	V _{CE} =3V, I _C =0.1mA	150		,
		$V_{CE} = 3V, I_{C} = 0.5 mA$	135	270	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =20mA, I _B =2.0mA		0.3	V
Current Gain-Bandwidth Product	f⊤	I _C =1.0mA, V _{CE} =6.0V f=100MHz	75		MHz



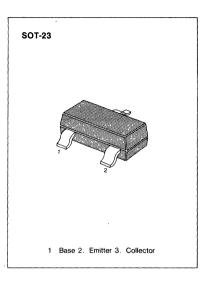
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DRIVER TRANSISTOR

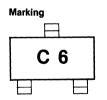
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Storage Temperature	V _{CBO} V _{CEO} V _{EBO} I _C P _C Tstg	50 45 5 50 350 150	V V V mA mW

[•] Refer to MMBT5086 for graphs



Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =100μA, I _E =0	50		V
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =1.0mA, I _B =0	45		V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_{E}=10\mu A, I_{C}=0$	5		V
Collector Cutoff Current	I _{CBO}	V _{CB} =40V, I _E =0		50	nA
Emitter Cutoff Current	I _{EBO}	V _{EB} =5.0V, I _C =0		50	nA
DC Current Gain	h _{FE}	V _{CE} =3V, I _C =0.1mA	150		
		V _{CE} =3V, I _C =0.5mA	200	400	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =20mA, I _B =2.0mA		0.3	V
Current Gain-Bandwidth Product	f⊤	I _C =1.0mA, V _{CE} =6.0V f=100MHz	75		MHz

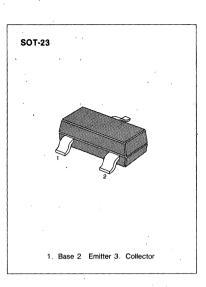


DRIVER TRANSISTOR

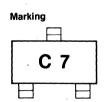
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50 .	V
Collector-Emitter Voltage	V _{CEO}	45 ·	\ v ·
Emitter-Base Voltage	V _{EBO}	5	. V
Collector Current	lc	50	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C

[•] Refer to MMBT5086 for graphs



Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =100μA, I _E =0	50	h	v
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =1.0mA, I _B =0	45	-	V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	5	-	V
Collector Cutoff Current	I _{CBO}	$V_{CB} = 40V, I_{E} = 0$		-50	nA
Emitter Cutoff Current	I _{EBO}	V _{EB} =5.0V, I _C =0		50	nA
DC Current Gain	h _{FE}	V _{CE} =3V, I _C =0.1mA	150		
		$V_{CE} = 3V, I_{C} = 0.5 mA$	300	600	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =20mA, I _B =2.0mA		0.3	V
Current Gain-Bandwidth Product	f _T	I _C =1.0mA, V _{CE} =6.0V f=100MHz	75		MHz

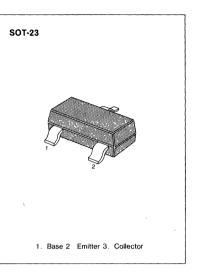


DRIVER TRANSISTOR

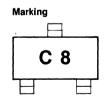
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Storage Temperature	V _{CBO} V _{CEO} V _{EBO} I _C P _C Tstg	50 45 5 50 350 150	V V V mA mW

[•] Refer to MMBT5086 for graphs



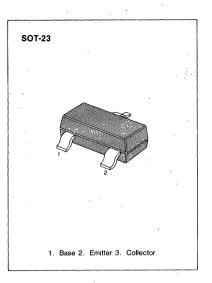
Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =100μA, I _E =0	50		V
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =1.0mA, I _B =0	45		V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	5		V
Collector Cutoff Current	I _{CBO}	V _{CB} =40V, I _E =0	1	50	nA
Emitter Cutoff Current	I _{EBO}	$V_{EB} = 5.0V, I_{C} = 0$		50	nA
DC Current Gain	h _{FE}	V _{CE} =3V, I _C =0.1mA	150		1
		$V_{CE}=3V$, $I_{C}=0.5mA$	450	900	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =20mA, I _B =2,0mA	1	0.3	V
Current Gain-Bandwidth Product	f _T	I _C =1.0mA, V _{CE} =6.0V f=100MHz	75		MHz



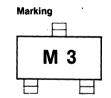
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{СВО}	50	V
Collector-Emitter Voltage	. V _{CEO}	40	· V
Emitter-Base Voltage	V _{EBO}	5	V
Collector Current	l _c	100	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C

[•] Refer to MMBT5086 for graphs



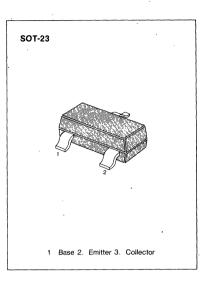
Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector Cutoff Current	I _{CBO}	V _{CB} =40V, I _E =0		100	nA
Emitter Cutoff Current	I _{EBO}	V _{EB} =5V, I _C =0		100	nA
DC Current Gain	h _{FE}	V _{CE} =6V, I _C =1mA	60	120	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =30mA, I _B =3mA	•	0.5	V
Base-Emitter On Voltage	V _{BE} (on)	I _C =1mA, V _{CE} =6V		0.8	V



ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	V
Collector-Emitter Voltage	V _{CEO}	40	V
Emitter-Base Voltage	. V _{EBO}	5	V
Collector Current	l _c	·100	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C

[•] Refer to MMBT5086 for graphs



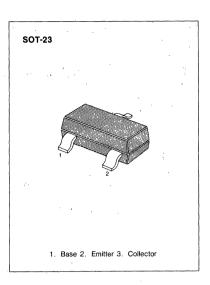
Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector Cutoff Current	I _{CBO}	V _{CB} =40V, I _E =0		100	nA.
Emitter Cutoff Current	I _{EBO}	$V_{EB}=5V$, $I_{C}=0$		100	nA
DC Current Gain	h _{FE}	V _{CE} =6V, I _C =1mA	90	180	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =30mÅ, I _B =3mA	•	0.5	V
Base-Emitter On Voltage	V _{BE} (on)	I _C =1mA, V _{CE} =6V		0.8	. v



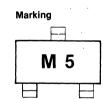
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	٧
Collector-Emitter Voltage Emitter-Base Voltage	V _{CEO}	40 5	V
Collector Current	`lc	100	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C

[•] Refer to MMBT5086 for graphs



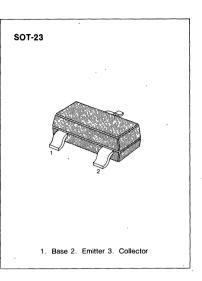
Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector Cutoff Current	І _{сво}	V _{CB} =40V, I _E =0.		100	nA
Emitter Cutoff Current	I _{EBO}	$V_{EB}=5V$, $I_{C}=0$		100	nA
DC Current Gain	h _{FE}	V _{CE} =6V, I _C =1mA	135	270	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =30mA, I _B =3mA		0.5	V
Base-Emitter On Voltage	V _{BE} (on)	$I_C=1$ mA, $V_{CE}=6$ V		0.8	٧



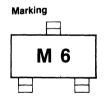
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit -
Collector-Base Voltage	V _{CBO}	50	V
Collector-Emitter Voltage	V _{CEO}	40	V
Emitter-Base Voltage	V _{EBO}	5	V
Collector Current	l _c	100	mA
Collector Dissipation	Pc	350	mŴ
Storage Temperature	Tstg	150	°C

[•] Refer to MMBT5086 for graphs



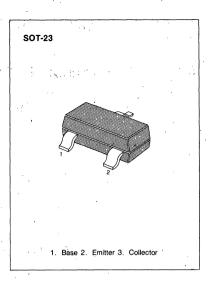
Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector Cutoff Current	I _{CBO}	V _{CB} =40V, I _E =0		100	nA
Emitter Cutoff Current	I _{EBO}	$V_{EB}=5V$, $I_{C}=0$		100	nA
DC Current Gain	h _{FE}	V _{CE} =6V, I _C =1mA	200	400	1
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =30mA, I _B =3mA		0.5	V
Base-Emitter On Voltage	V _{BE} (on)	I _C =1mA, V _{CE} =6V		0.8	V
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ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	V
Collector-Emitter Voltage	V _{CEO}	40	V
Emitter-Base Voltage	V _{EBO}	5	V
Collector Current	' lc	100	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C

[•] Refer to MMBT5086 for graphs



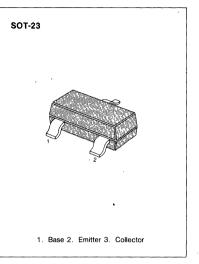
Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector Cutoff Current	I _{CBO}	V _{CB} =40V, I _E =0		100	nA
Emitter Cutoff Current	I _{EBO}	$V_{EB}=5V$, $I_{C}=0$		100	nA
DC Current Gain	h _{FE}	$V_{CE}=6V$, $I_{C}=1$ mA	300	600	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =30mA, I _B =3mA	. *	0.5	V
Base-Emitter On Voltage	V _{BE} (on)	$I_C=1 \text{ mA}, V_{CE}=6V$		0.8	V



AM/FM RF AMPLIFIER TRANSISTOR

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	V
Collector-Emitter Voltage	V _{CEO}	25	V
Emitter-Base Voltage	V _{EBO}	5	V
Collector Current	l _c	50	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C



ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector Cutoff Current	I _{CBO}	V _{CB} =15V, I _E =0			100	nA
DC Current Gain	h _{FE}	$V_{CE}=3V$, $I_{C}=0.5mA$	30		60	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1.0mA			0.3	V
Current Gain-Bandwidth Product	f _T	$I_C=1$ mA, $V_{CE}=6$ V f=100MHz	150			MHz
Output Capacitance	Cob	V _{CB} =6V, I _E =0 f=1MHz		2		pF
Noise Figure	NF	$I_C=0.5$ mA, $V_{CE}=6$ V $f=1$ MHz, $Rg=500$ Ω		2.5		dB

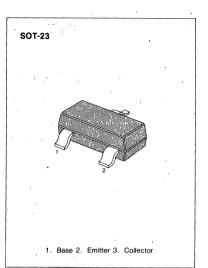
Marking F 1

NPN EPITAXIAL SILICON TRANSISTOR

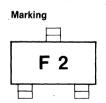
AM/FM RF AMPLIFIER TRANSISTOR

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Storage Temperature	V _{CBO} V _{CEO} V _{EBO} I _C P _C Tstq	50 25 5 50 350 150	V V V mA mW



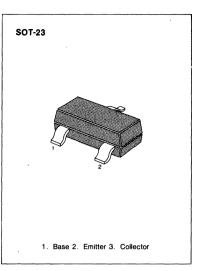
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector Cutoff Current DC Current Gain	I _{CBO}	$V_{CB}=15V, I_{E}=0$ $V_{CE}=3V, I_{C}=0.5mA$	40		100 80	nA
Collector-Emitter Saturation Voltage Current Gain-Bandwidth Product	V _{CE} (sat)	$I_C=10$ mA, $I_B=1.0$ mA $I_C=1$ mA, $V_{CE}=6$ V f=100MHz	150	,	0.3	V MHz
Output Capacitance	Cob	V _{CB} =6V, I _E =0 f=1MHz		· 2 .		pF
Noise Figure	NF	I_C =0.5mA, V_{CE} =6V f=1MHz, Rg=500 Ω		2.5		dB



AM/FM RF AMPLIFIER TRANSISTOR

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	V
Collector-Emitter Voltage	V _{CEO}	25	V
Emitter-Base Voltage	V _{EBO}	5	V
Collector Current	l _c	50	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C



ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector Cutoff Current	I _{CBO}	V _{CB} =15V, I _E =0			100	nA
DC Current Gain	h _{FE}	$V_{CE}=3V$, $I_{C}=0.5mA$	60		120	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1.0mA			0.3	V
Current Gain-Bandwidth Product	f _T	I _C =1mA, V _{CE} =6V f=100MHz	150			MHz
Output Capacitance	Cob ⁻	V _{CB} =6V, I _E =0 f=1MHz		2		pF
Noise Figure	NF	$I_C=0.5$ mA, $V_{CE}=6$ V $t=1$ MHz, $Rg=500$ Ω		2.5		dB

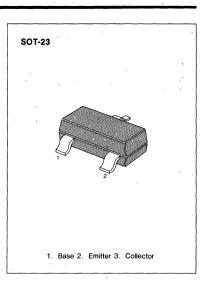
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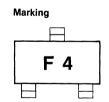
AM/FM RF AMPLIFIER TRANSISTOR

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Characteristic Symbol		Unit
Collector-Base Voltage	V _{CBO}	50	V
Collector-Emitter Voltage	V _{CEO}	25	V
Emitter-Base Voltage	V _{EBO}	5	V
Collector Current	l _C	50	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C



Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector Cutoff Current	I _{CBO}	V _{CB} =15V, I _E =0			100	nA
DC Current Gain	h _{FE}	$V_{CE} = 3V, I_{C} = 0.5 \text{mA}$	90		180	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C=10mA$, $I_B=1.0mA$			0.3	· V
Current Gain-Bandwidth Product	f _T	I _C =1mA, V _{CE} =6V f=100MHz	150			MHz
Output Capacitance	Cob	V _{CB} =6V, I _E =0 f=1MHz	1	2		pF
Noise Figure	NF	$I_C=0.5$ mA, $V_{CE}=6$ V f=1MHz, Rg=500 Ω		2.5		dB

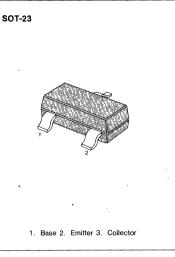


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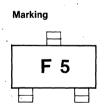
AM/FM RF AMPLIFIER TRANSISTOR

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Storage Temperature	V _{CBO} V _{CEO} V _{EBO} I _C P _C Tstg	50 25 5 50 350 150	V V V mA mW

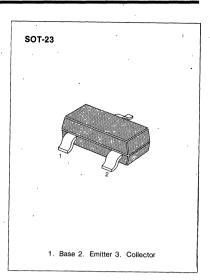


Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector Cutoff Current	I _{CBO}	V _{CB} =15V, I _E =0			100	nA
DC Current Gain	h _{FE}	V _{CE} =3V, I _C =0.5mA	135		270	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = 1 \text{ OmA}, I_B = 1.0 \text{ mA}$			0.3	V
Current Gain-Bandwidth Product	f _T	$I_C=1$ mA, $V_{CE}=6$ V f=100MHz	150			MHz
Output Capacitance	Cob	$V_{CB}=6V$, $I_E=0$ f=1MHz		2		ρF
Noise Figure	NF	$I_{C}=0.5$ mA, $V_{CE}=6$ V $f=1$ MHz, $Rg=500\Omega$,	2.5		dB

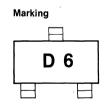


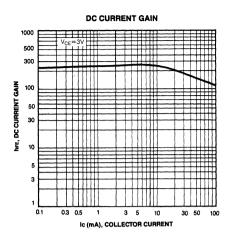
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

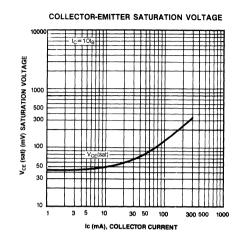
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	40	V
Collector-Emitter Voltage	V _{CEO}	35	V
Emitter-Base Voltage	V _{EBO}	5.0	V
Collector Current	, I _C	100	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C

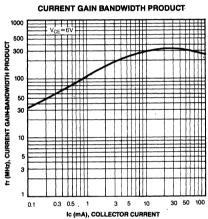


Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector Cutoff Current	Ісво	$V_{CB}=25V, I_{F}=0$		50	nA
Emitter Cutoff Current	I _{EBO}	V _{EB} =5V, I _C =0		.50	ńΑ
DC Current Gain	h _{FE}	$V_{CE} = 3V, I_{C} = 0.1 \text{mA}$	150		
*1		V _{CE} =3V, I _C =0.5mA	200	400	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 100 \text{mA}, I_{B} = 10 \text{mA}$		0.3 · ·	V
Base-Emitter On Voltage	V _{BE} (on)	I _C =0.5mA, V _{CE} =3V	0.55	0.65	V
Current Gain-Bandwidth Product	f _T	$V_{CE} = 6V I_{E} = 1.0 mA$	100		MHz
		f=100MHz			





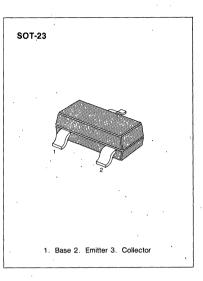




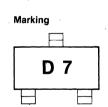
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Storage Temperature	V _{CBO} V _{CEO} V _{EBO} I _C P _C Tstg	40 35 5.0 100 350	V V V mA mW

[•] Refer to MMBC1622D6 for graphs



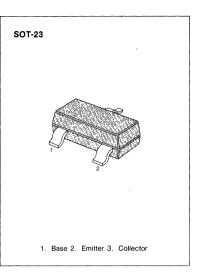
Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector Cutoff Current	Ісво	V _{CB} =25V, I _E =0		50	nA
Emitter Cutoff Current	I _{EBO}	$V_{EB}=5V$, $I_{C}=0$		50	nA
DC Current Gain	h _{FE}	$V_{CE}=3V$, $I_{C}=0.1mA$	150		
		$V_{CE}=3V$, $I_{C}=0.5mA$	300	600	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C=100mA$, $I_B=10mA$	-	0.3	V
Base-Emitter On Voltage	V _{BE} (on)	$I_{c}=0.5\text{mA}. V_{cr}=3V$	0.55	0.65	V
Current Gain-Bandwidth Product	f _T	V _{CE} =6V I _E =1mA f=100MHz	100		MHz



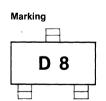
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Storage Temperature	V _{CBO} V _{CEO} V _{EBO} I _C P _C Tstq	40 35 5.0 100 350	V V W MA mW

[•] Refer to MMBC1622D6 for graphs

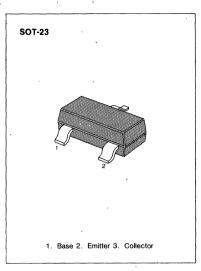


Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector Cutoff Current	I _{CBO}	$V_{CB} = 25V, I_{E} = 0$		50	nA
Emitter Cutoff Current	I _{EBO}	$V_{EB}=5V$, $I_{C}=0$		50	n'A
DC Current Gain	h _{FE}	V _{CE} =3V, I _C =0.1mA	150		
	1	$V_{CE} = 3V, I_{C} = 0.5 mA$	450	900	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C=100mA$, $I_B=10mA$		0.3	V
Base-Émitter On Voltage	V _{BE} (on)	I _C =0.5mA, V _{CE} =3V	0.55	0.65	V
Current Gain-Bandwidth Product	f⊤	V _{CE} =6V I _E =1mA f=100MHz	100		MHz

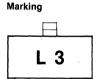


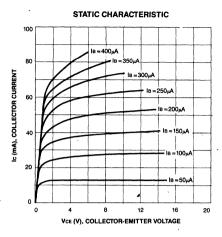
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

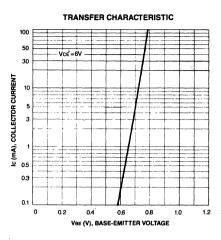
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	V
Collector-Emitter Voltage	V _{CEO}	40	V
Emitter-Base Voltage	V _{EBO}	5.0	V
Collector Current	l _C	100	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C
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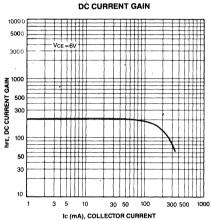


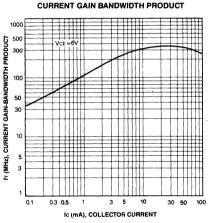
Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector Cutoff Current	I _{CBO}	V _{CB} =40V, I _E =0		100	· nA
Emitter Cutoff Current	I _{EBO}	$V_{EB}=5V$, $I_{C}=0$		100	nA
DC Current Gain	h _{FE}	$V_{CE}=6V$, $I_{C}=1.0mA$	60	120	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 100 \text{mA}, I_{B} = 10 \text{mA}$		0.3	v
Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =100mA, I _B =10mA	1	1.0	V
Base-Emitter On Voltage	V _{BE} (on)	I _C =1.0mA .V ==6V	0.6	. 0.7	V
Current Gain-Bandwidth Product	f _T	V _{CE} =6V I _E =10mA	200		MHz
		f=100MH2	1		

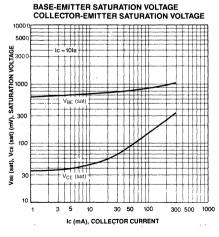


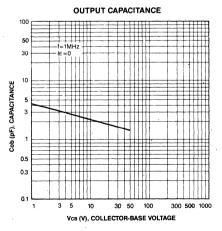








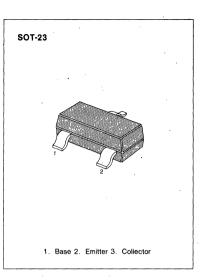




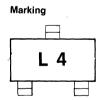
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	V
Collector-Emitter Voltage	V _{CEO}	40	V
Emitter-Base Voltage	V _{EBO}	5.0	V
Collector Current	l _c	100	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C

[•] Refer to MMBC1623L3 for graphs



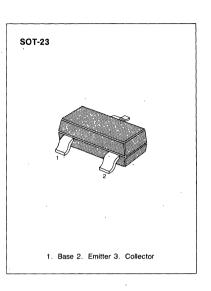
Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector Cutoff Current	I _{CBO}	V _{CB} =40V, I _E =0		100	nA
Emitter Cutoff Current	I _{EBO} .	$V_{EB}=5V$, $I_{C}=0$		100	nA ´.
DC Current Gain	h _{FE}	V _{CE} =6V, I _C =1.0mA	90	180	Ì
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =100mA, I _B =10mÅ		0.3	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =100mA, I _B =10mA		1.0	٧.
Base-Emitter On Voltage	V _{BE} (on)	I _C =1.0mA, V _{CF} =6V	0.6	0.7	V
Current Gain-Bandwidth Product	f⊤	V _{CE} =6V, I _E =10mA	200		MHz
		f=100MHz			



ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	.50	ν .
Collector-Emitter Voltage	. V _{CEO}	40	V
Emitter-Base Voltage	V _{EBO}	5.0	V
Collector Current	l _c	100	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C

[•] Refer to MMBC1623L3 for graphs



ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector Cutoff Current	I _{CBO}	$V_{CB} = 40V, I_{E} = 0$		100	nA
Emitter Cutoff Current	I _{EBO}	$V_{EB}=5V$, $I_{C}=0$		100	. nA
DC Current Gain	h _{FE}	$V_{CE}=6V$; $I_{C}=1.0mA$	135	270	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =100mA, I _B =10mA		. 0.3	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =100mA, I _B =10mA		1.0	V
, Base-Emitter On Voltage	V _{BE} (on)	I _C =1.0mA, V _{CF} =6V	0.6	0.7	V
Current Gain-Bandwidth Product	f _T	$V_{CE}=6V$, $I_{E}=10mA$	200		MHz
		f=100MHz			,

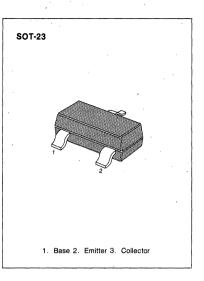
Marking



ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	V
Collector-Emitter Voltage	V _{CEO}	40	V
Emitter-Base Voltage	V _{EBO}	5.0	V
Collector Current	lc	100	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C

[•] Refer to MMBC1623L3 for graphs



ELECTRICAL CHARACTERISTICS (Ta=25°C)

Symbol	Test Condition	Min	Max	Unit
I _{CBO}	V _{CB} =40V, I _E =0		100	nA
I _{EBO}	$V_{EB}=5V$, $I_{C}=0$		100	nA
h _{FE}	$V_{CE}=6V$, $I_{C}=1.0mA$	200	400	
V _{CE} (sat)	$I_C=100mA$, $I_B=10mA$	1	0.3	· V
V _{BE} (sat)	$I_C=100mA$, $I_B=10mA$		1.0	V
V _{BE} (on)	$I_C=1.0mA$, $V_{CE}=6V$	0.6	0.7	V
f _T	$V_{CE}=6V$, $I_E=10mA$	200		MHz
	· f=100MHz		i	
	I _{CBO} I _{EBO} h _{FE} V _{CE} (sat) V _{BE} (sat) V _{BE} (on)	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$

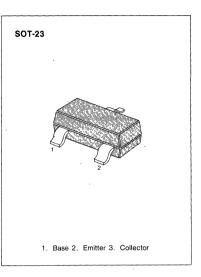
Marking



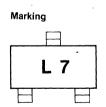
ABSOLUTE MAXIMUM RATINGS $(T_a = 25 \degree C)$

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage	V _{CBO} V _{CEO}	50 40	V V
Emitter-Base Voltage Collector Current Collector Dissipation	V _{EBO} Ic Pc	5.0 100 350	mA mW
Storage Temperature	Tstg	150	°C

[•] Refer to MMBC1623L3 for graphs

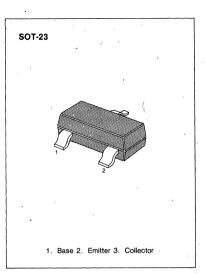


	Characteristic	Symbol	Test Condition	Min	Max	Unit
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	Collector Cutoff Current	СВО	$V_{CB}=40V$, $I_E=0$		100	nA
	Emitter Cutoff Current	I _{EBO}	$V_{EB} = 5V, I_{C} = 0$		100	nA
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	DC Current Gain	h _{FE}	$V_{CE}=6V$, $I_{C}=1.0mA$	300	600	ļ
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 100 \text{mA}, I_{B} = 10 \text{mA}$. 0.3	V
Current Gain-Bandwidth Product f_T $V_{CE}=6V$. $I_E=10mA$ 200 · MHz	Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =100mA, I _B =10mA		1.0	V
100 - 110	Base-Emitter On Voltage	V _{BE} (on)	I _C =1.0mA V6V	0.6	0.7	V
f=100MHz	Current Gain-Bandwidth Product	f _T	V _{CE} =6V. I _E =10mA	200		MHz
			f=100MH2			

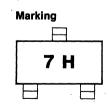


ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	20	V
Collector-Emitter Voltage	V _{CEO}	12	V
Emitter-Base Voltage	V _{EBO}	2.5	ν
Collector Current	l _c	50	mA
Collector Dissipation (T _a =25°C)	Pc	350	mW
Derate above 25°C		2.8	mW/°C
Junction Temperature	Tj.	150	°C
Storage Temperature	Tstg	-55~150	°C

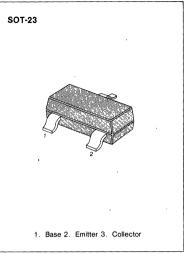


Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =0.01mA, I _E =0	20		V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C=3mA$, $I_B=0$	12	Ì	V
Emitter Base Breakdown Voltage	BV _{EBO}	I _E =0.01mA, I _C =0	2.5		· V
Collector Cutoff Current	I _{CBO}	$V_{CB} = 15V, I_{E} = 0$		0.02	μΑ
DC Current Gain	h _{FE}	$V_{CE}=1V$, $I_{C}=3mA$	25		
Collector Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1mA		0.4	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =10mA, I _B =1mA		. 1	V.
Current Gain Bandwidth Product	f _T	V_{CE} =6V, I_{C} =5mA, f=100MHz	900		MHz
Collector Base Capacitance	Ccb	$V_{CB}=10V$, $I_E=0$, $f=0.1MHz$ to $1MHz$		1	рF
Small Signal Current Gain	hfe	$V_{CE}=6V$, $I_{C}=2mA$, $f=1KHz$	25		
Noise Figure	NF	V _{CE} =6V, I _C =1.5mA, f=200MHz		4.5	dB
		Rs=50Ω			
Common Emitter Amplifier Power Gain	Gpe	$V_{CE}=6V$, $I_{C}=5mA$, $f=200MHz$	15		dB



ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

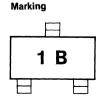
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	60	V
Collector-Emitter Voltage	V _{CEO}	30	, V
Emitter-Base Voltage	V _{EBO}	5	V
Collector Current	l _c	600	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C



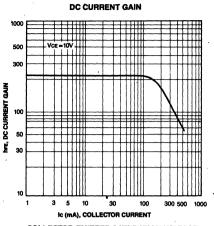
ELECTRICAL CHARACTERISTICS (T_a=25°C)

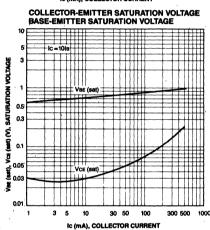
Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =10μA, I _E =0	60		٧.
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =10mA, I _B =0	30		V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	5		V
Collector Cutoff Current	I _{CEX}	V _{CE} =60V, V _{BE} =3V		10	· nA
Collector Cutoff Current	Ісво	V _{CB} =50V, I _E =0		0.01	μΑ
DC Current Gain	h _{FE}	$V_{CE} = 10V, I_{C} = 0.1 \text{mA}$	35		
		$V_{CE}=10V$, $I_{C}=1.0mA$	50		
		$V_{CE}=10V$, $I_{C}=10mA$	75		
		*V _{CE} =10V, I _C =150mA	100	300	
		*V _{CE} =10V, I _C =500mA	30		
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =150mA, I _B =15mA		0.4	V
. •		I _C =500mA, I _B =50mA		1.6	V
*Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_C=150mA$, $I_B=15mA$		1.3	V
•		I _C =500mA, I _B =50mA		2.6	V
Current Gain-Bandwidth Product	f _T	I _C =20mA, V _{CE} =20V f=100MHz	250		MHz
Output Capacitance	Cob	V _{CB} =10V, I _E =0		8.0	pF
T 0 T		f=1.0MHz		0.5	
Turn On Time	ton	$V_{CC}=30V, V_{BE}=0.5V$		35	ns
T	toff	I _C =150mA, I _{B1} =15mA			
Turn Off Time	ton	$V_{CC}=30V$, $I_{C}=150mA$ $I_{B1}=I_{B2}=15mA$		285	ns

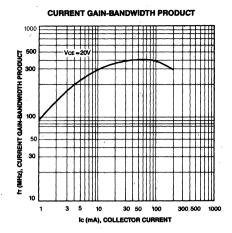
^{*}Pulse test: Pulse Width≤300µs, Duty Cycle≤2%

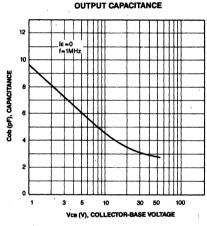








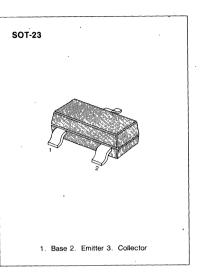




ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Storage Temperature	V _{CBO} V _{CEO} V _{EBO} I _C P _C Tstg	75 40 6 600 350 150	V V V mA mW

[•] Refer to MMBT2222 for graphs



ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C}=10\mu A, I_{E}=0$	75		V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C=10mA$, $I_B=0$	40		V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	6		V
Collector Cutoff Current	I _{CBO}	$V_{CB} = 60V, I_{E} = 0$		0.01	μΑ
*DC Current Gain	h _{FE}	$V_{CE} = 10V, I_{C} = 0.1 mA$	35		
		$V_{CE}=10V$, $I_{C}=1mA$	50		
·		$V_{CE}=10V$, $I_{C}=10mA$	75		
		$V_{CE} = 10V, I_{C} = 150mA$	100	300	
·		$V_{CE} = 10V, I_{C} = 500mA$	40		
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C=150$ mA, $I_B=15$ mA		0.3	, V
		I _C =500mA, I _B =50mA		1.0	V
*Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_C=150$ mA, $I_B=15$ mA	0.6	1.2	V
		I _C =500mA, I _B =50mA		2.0	V
Current Gain-Bandwidth Product	f _T	I _C =20mA, V _{CE} =20V f=100MHz	300		MHz
Collector-Base Capacitance	Cob	V _{CB} =10V, I _E =0 f=1MHz		8	, pF
Noise Figure	NF	$I_C = 100\mu A$, $V_{CE} = 10V$ $R_S = 1K\Omega$, $f = 1KHz$	· 4	4	dB
Turn On Time	ton."	V _{CC} =30V, I _C =150mA V _{BE} =0.5V, I _{B1} =15mA		35	ns
Turn Off Time	toff	$V_{CC}=30V, I_{C}=150mA$ $I_{B1}=I_{B2}=15mA$		285	ns

^{*}Pulse test: Pulse Width<300µs, Duty Cycle≤2%

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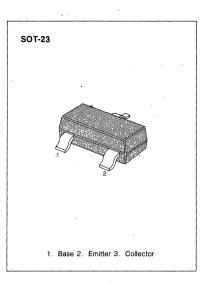


LOW NOISE TRANSISTOR

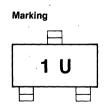
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current	V _{CBO}	60	V
	V _{CEO}	60	V
	V _{EBO}	6	V
	I _C	50	mA
Collector Dissipation Storage Temperature	P _C	350	mW .
	Tstg	150	°C

[•] Refer to MMBT5088 for graphs



Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C}=10\mu A, I_{E}=0$	60		V
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =10mA, I _B =0	60	{	V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	5	ŀ	V
Collector Cutoff Current	ICBO	V _{CB} =45V, I _E =0		10	nA
Emitter Cutoff Current	I _{EBO}	V _{EB} =5V, I _C =0	,	10	nA
DC Current Gáin	h _{FE}	V _{CE} =5V, I _C =1mA	250	1	
		V _{CE} =5V, I _C =1UmA	1	800	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C=1$ mA, $I_B=0.1$ mA	1	0.35	V
Base-Emitter On Voltage	V _{BE} (on)	I _C =1mA, V _{CE} =5V		0.95	V
Output Capacitance	Cob	$V_{CB}=5.0V, I_{E}=0$ f=1MHz,		6	pF
Noise Figure	NF	$I_C=10\mu A$, $V_{CE}=5V$ $R_S=10K\Omega$, $f=1KHz$		3	dB

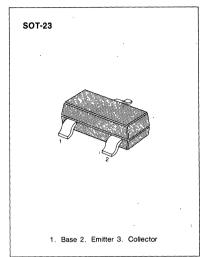


PNP EPITAXIAL SILICON TRANSISTOR

GENERAL PURPOSE TRANSISTOR

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Storage Temperature	V _{CBO} V _{CEO} V _{EBO} Ic P _C Tstg	60 40 5 600 350	V V MA mW



ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C}=10\mu A, I_{E}=0$	60		٧
*Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C=10mA$, $I_B=0$	40		V.
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A$, $I_C = 0$	5		V
Collector Cutoff Current	I _{CEX}	$V_{CE} = 30V, V_{BE} = 0.5V$		50	nA
Collector Cutoff Current	I _{CBO}	$V_{CB}=50V$, $I_{E}=0$	+	0.02	μΑ
DC Current Gain	h _{FE}	$V_{CE} = 10V, I_{C} = 0.1 \text{mA}$	35		
		$V_{CE}=1$ QV, $I_{C}=1.0$ mA	50		
		$V_{CE}=10V$, $I_{C}=10mA$	75		
•		*V _{CE} =10V, I _C =150mA	100	300	
		*V _{CE} =10V, I _C =500mA	30		
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C=150mA$, $I_B=15mA$	1	0.4	V
	1	I _C =500mA, I _B =50mA	1	1.6	V
*Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =150mA, I _B =15mA	}	1.3	V
		I _C =500mA, I _B =50mA		2.6	V
Current Gain-Bandwidth Product	f _T	I _C =50mA, V _{CE} =20V	200		MHz
	_	f=100MHz			
Output Capacitance	Cob	$V_{CB}=10V$, $I_E=0$		8.0	pF
		f=1.0MHz			
Turn On Time	ton	$V_{cc}=30V, I_{c}=150mA$		45	ns
		$I_{B1} = 15 \text{mA}$			
Turn Off Time	toff	$V_{cc}=6V$, $I_c=150mA$		100	ns
		$I_{B1} = I_{B2} = 15 \text{mA}$			

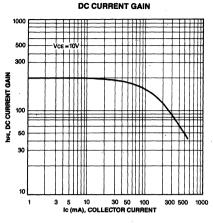
^{*}Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%

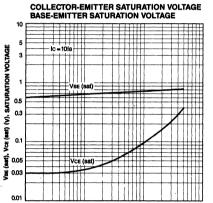
Marking



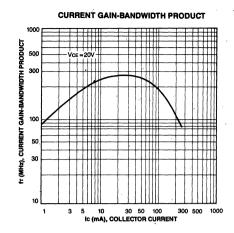
SAMSUNG SEMICONDUCTOR

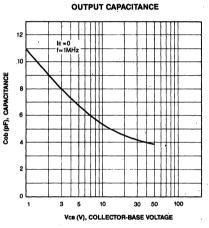
3





10 30 50 100 ic (mA), COLLECTOR CURRENT

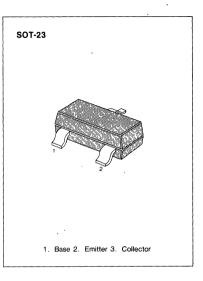




ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

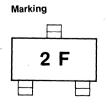
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	60	V
Collector-Emitter Voltage	V _{CEO}	60	V
Emitter-Base Voltage	V _{EBO}	. 5	V
Collector Current	lc	600	mA
Collector Dissipation .	Pc	350	mW
Storage Temperature	Tstg	150	°C

^{*}Refer to MMBT2907 for graphs



Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C}=10\mu A, I_{E}=0$	60		V
*Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =10mA, I _B =0	60		V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	5		V
Collector Cutoff Current	I _{CBO}	V _{CB} =50V I _E =0		0.01	. μΑ
DC Current Gain	h _{FE}	$V_{CE} = 10V, I_C = 0.1 \text{mA}$	75		
		$V_{CE}=10V$, $I_{C}=1.0mA$	·100		
		$V_{CE}=10V$, $I_{C}=10mA$	100		•
		*V _{CE} =10V, I _C =150mA	100	300	
		*V _{CE} =10V, I _C =500mA	50	1	
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 150 \text{mA}, I_{B} = 15 \text{mA}$		0.4	V
		I _C =500mA, I _B =50mA		1.6	V
*Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_{C}=150mA, I_{B}=15mA$		1.3	V
		I_C =500mA, I_B =50mA		2.6	V
Current Gain-Bandwidth Product	f _T	$I_C=50mA$, $V_{CE}=20V$	200		MHz
		f=100MHz ·			
Output Capacitance	Cob	$V_{CB} = 10V$, $I_{E} = 0$		8	pF
		f=1.0MHz	`	1	
Turn On Time	ton	$V_{cc} = 30V, i_c = 150mA$		50	ns
		I _{B1} =15mA		1	
Turn Off Time	toff	V _{CC} =6V, I _C =150mA		110	ns
		$I_{B1} = I_{B2} = 15 \text{mA}$			

^{*}Pulse Test: Pulse Width \leq 300 μ s, Duty Cycle \leq 2%

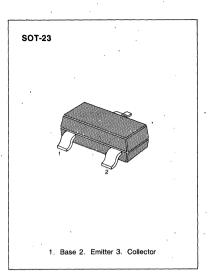




ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

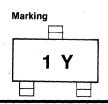
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Storage Temperature	V _{CBO} V _{CEO} V _{EBO} I _C P _C Tstg	60 40 6 200 350 150	V V V mA mW

^{*}Refer to MMBT3904 for graphs



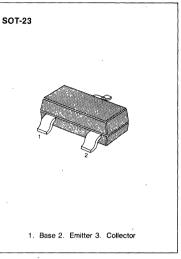
Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C}=10\mu A, I_{E}=0$	60		٧
*Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C=1 \text{ mA}, I_B=0$	40		V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	6		V
Collector Cutoff Current	ICEX	$V_{CE}=30V, V_{EB}=3V$	1	50	nA
*DC Current Gain	h _{FE}	$V_{CE}=1V$, $I_{C}=0.1mA$	` 20		
•		$V_{CE}=1V$, $I_{C}=1mA$	35		
	}	$V_{CE}=1V$, $I_{C}=10mA$	50	150	
		$V_{CE}=1V$, $I_{C}=50mA$	30		
		$V_{CE}=1V$, $I_{C}=100mA$, 15		
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1mA		0.2	· V
•		I _C =50mA, I _B =5mÅ	}	0.3	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =10mA, I _B =1mA	0.65	0.85	V
		I _C =50mA, I _B =5mA	1	0.95	'V,
Current Gain-Bandwidth Product	f⊤	$I_C=10mA$, $V_{CE}=20V$	250		МНz
		f=100MHz			
Output Capacitance	Cob	$V_{CB}=5V$, $I_{E}=0$	1	4	pF
•		f=1MHz			
Noise Figure	NF	I _C =100μA, V _{CE} =5V	}	6	dB
		$R_s=1K\Omega$			
		f=10Hz to 15.7KHz			
Turn On Time	ton	$V_{CC} = 3V, V_{BE} = 0.5V$		70	ns
		I _C =10mA, I _{B1} =1mA			
Turn Off Time	toff	V _{CC} =3V, I _C =10mA		225	ns
S		I _{B1} =I _{B2} =1mA	}		

^{*}Pulse Test: Pulse Width≤300µs, Duty Cycle≤2%



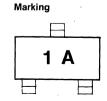
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Symbol	Rating	Unit
V _{CBO}	60	V
V _{CEO}	40	V
V _{EBO}	6	V
I _C	200	mA
Pc	350	mW
Tstg	150	°C
	V _{CBO} V _{CEO} V _{EBO} I _C P _C	V _{CBO} 60 V _{CEO} 40 V _{EBO} 6 I _C 200 P _C 350

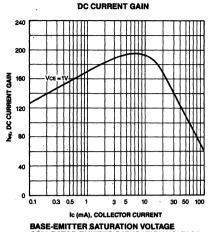


Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C}=10\mu A, I_{E}=0$	60		V
* Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C=1$ mA, $I_B=0$	40		V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	6		V
Collector Cutoff Current	I _{CEX}	V _{CE} =30V, V _{EB} =3V		50	nA
*DC Current Gain	h _{FE}	$V_{CE} = 1V, I_{C} = 0.1 mA$	40		
		$V_{CE}=1V$, $I_{C}=1mA$	70		
4		$V_{CE}=1V$, $I_{C}=10mA$	100	300	
		V _{CE} =1V, I _C =50mA	60	ĺ	
		V _{CE} =1V, I _C =100mA	30	ı	
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1mA		0.2	V
		I _C =50mA, I _B =5mA		0.3	V
*Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =10mA, I _B =1mA	0.65	0.85	V
		I _C =50mA, I _B =5mA		0.95	V
Current Gain-Bandwidth Product	f⊤	I _C =10mA, V _{CE} =20V	300		MHz
	ł	f=100MHz			
Output Capacitance	Cob.	V _{CB} =5V, I _E =0		4	рF
	1	f=1MHz			
Noise Figure	NF	$I_{C} = 100 \mu A, V_{CE} = 5V$	1	5	dB
•		$R_S = 1 K\Omega$			
		f=10Hz to 15.7KHz			
Turn On Time	ton	$V_{CC} = 3V, V_{BE} = 0.5V$		70 .	ns
•		$I_{C} = 10 \text{mA}, I_{B1} = 1 \text{mA}$			
Turn Off Time	toff	V _{cc} =3V, I _c =10mA		250	ns
		$I_{B1} = I_{B2} = 1 \text{ mA}$			

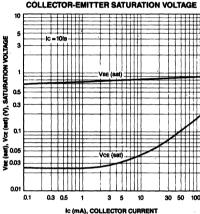
^{*}Pulse Test: Pulse Width \leq 300 μ s, Duty Cycle \leq 2%



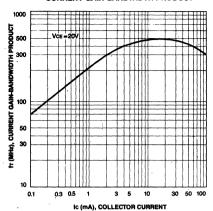




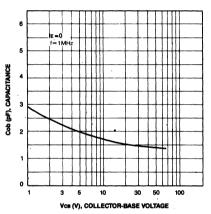




CURRENT GAIN-BANDWIDTH PRODUCT

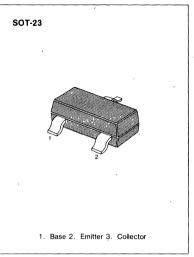


OUTPUT CAPACITANCE



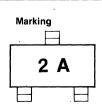
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

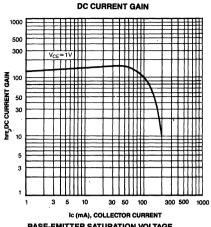
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage	V _{CBO}	40 40	V
Emitter-Base Voltage	V _{EBO}	5	. V
Collector Current	lc	200	mA
Collector Dissipation	Pc	350	ṁW
Storage Temperature	Tstg	150	°C

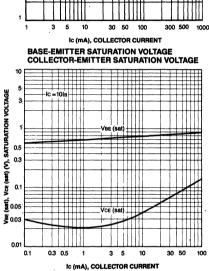


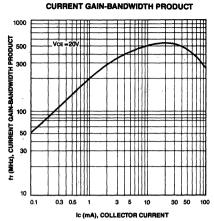
Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C}=10\mu A, I_{E}=0$	40		V
*Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C}=1.0mA, I_{B}=0$	40		V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	5		V
Collector Cutoff Current	I _{CEX}	$V_{CE}=30V$, $V_{EB}=3V$		50	nA
*DC Current Gain	h _{FE}	$V_{CE} = 1V, I_{C} = 0.1 \text{mA}$	60		
,		$V_{CE}=1V$, $I_{C}=1mA$	80		
		$V_{CE}=1V$, $I_{C}=10mA$	100	300	
,		$V_{CE}=1V$, $I_{C}=50mA$	60		
•		$V_{CE} = 1V, I_{C} = 100mA$	30		
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1mA		0.25	V
		$I_C=50$ mA, $I_B=5.0$ mA		0.4	V
*Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_C=10mA$, $I_B=1.0mA$	0.65	0.85	V
•		$I_C=50mA$, $I_B=5.0mA$		0.95	V
Current Gain-Bandwidth Product	f⊤	$I_C=10\text{mA}, V_{CE}=20\text{V}$	250		MHz
		f=100MHz			
Output Capacitance	Cob	$V_{CB}=5V$, $I_E=0$		4.5	pF
		f=1.0MHz			
Noise Figure	NF	$I_{C} = 100 \mu A, V_{CE} = 5 V$		4	dB
•	•	$R_S=1K\Omega$			
		f=10Hz to 15.7KHz			
Turn On Time	ton	V _{CC} =3V, V _{BE} =0.5V		70	ns
		I _C =10mA, I _{B1} =1mA			
Turn Off Time	toff	V _{CC} =3V, I _C =10mA		300	ns
•		$I_{B1} = I_{B2} = 1 \text{ mA}$			

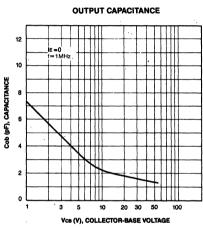
^{*}Pulse Test: Pulse Width≤300µs, Duty Cycle≤2%





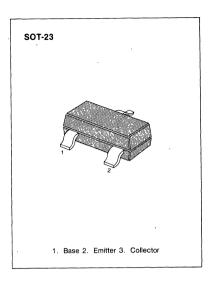






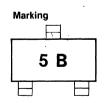
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	40	V
Collector-Emitter Voltage	V _{CEO}	30	V
Emitter-Base Voltage	V _{EBO}	5	. v
Collector Current	lc .	200	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C
Thermal Resistance Junction to Ambient	Rth(j-a)	357	°C/W



Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =10μA, I _E =0	40		٧
*Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C=1$ mA, $I_E=0$	30		V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10\mu A, I_C = 0$	5		٧
Collector Cutoff Current	I _{CBO}	$V_{CB}=20V$, $I_{E}=0$		50	nA
Emitter Cutoff Current	I _{EBO}	$V_{BE}=3V$, $I_{C}=0$		50	· nA
* DC Current Gain	h _{FE}	V _{CE} =1V, I _C =2mA	50	150	
		$V_{CE}=1V$, $I_{C}=50mA$	25		
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =50mA, I _B =5mA	i	0.3	V
* Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =50mA, I _B =5mA		0.95	V
Current Gain-Bandwidth Product	f⊤	V_{CE} =20V, I_{C} =10mA, f=100MHz	250		MHz
Collector Output Capacitance	Cob	V_{CB} =5V, I_{E} =0, f=100MHz		4	pF
Collector Input Capacitance	Cib	V_{BE} =0.5V, I_{C} =0, f=100KHz		. 8	pF
Collector-Base Capacitance	Ccb	$V_{CB}=5V$, $I_{E}=0$, $f=100KHz$,	4	pF
Noise Figure	NF	V_{CE} =5V, I_{C} =100 μ A, Rs=1k Ω		6	dB
		Noise Bandwidth=10Hz to 15.7KHz		,	

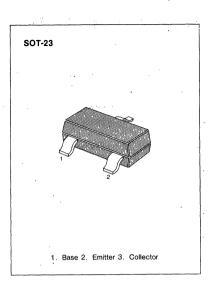
^{*} Pulse Test: PW≤300µs, Duty Cycle≤2%



ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

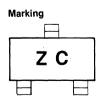
Unit
V
V
· V
mA .
mW
°C

[•] Refer to MMBT3904 for graphs



Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =10μA, I _E =0	30		٧
*Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C=1.0\text{mA}, I_B=0$	25		V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	5	,	V
Collector Cutoff Current	I _{CBO}	V _{CB} =20V, I _E =0		50	nA
Emitter Cutoff Current	I _{EBO}	V _{EB} =3V, I _C =0		50	nA
DC Current Gain	h _{FE}	$V_{CE}=1V$, $I_{C}=2mA$	120	360	
		$V_{CE}=1V$, $I_{C}=50mA$	60		
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C=50$ mA, $I_B=5.0$ mA		0.3	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_C=50$ mA, $I_B=5.0$ mA	1	0.95	V
Current Gain-Bandwidth Product	f _T	I _C =10mA, V _{CE} =20V	300		MHz
		f=100MHz		ì	
Output Capacitance	Cob	V _{CB} =5V, I _E =0		4	pF
		f=1.0MHz			
Noise Figure	NF ·	I _C =100μA, V _{CE} =5V		. 5	dB
		$R_s = 1 K\Omega$			
		f=10Hz to 15.7KHz			

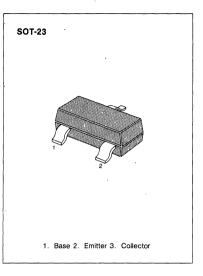
^{*} Pulse Test: Pulse Width≤300µs, Duty Cycle≤2%



ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

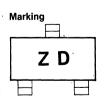
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	30	V
Collector-Emitter Voltage	V _{CEO}	30	V
Emitter-Base Voltage	V _{EBO}	4	V
Collector Current	l _c	200 .	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C

[•] Refer to MMBT 3906 for graphs



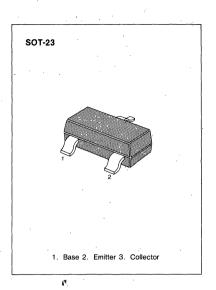
Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 10 \mu A, I_{E} = 0$	30	,	V
*Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C=1$ mA, $I_E=0$	30		V
Emitter-Base Breakdown Voltage	BV_{EBO}	$I_E = 10 \mu A, I_C = 0$	4		V
Collector Cutoff Current	I _{CBO}	V _{CB} =20V, I _E =0		50	nA
Emitter Cutoff Current	I _{EBO}	$V_{EB}=3V$, $I_{C}=0$		50	nA
DC Current Gain	h _{FE}	$V_{CE}=1V$, $I_{C}=2.0mA$	50	150	
		$V_{CE}=1V$, $I_{C}=50mA$	25]	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =50mA, I _B =5.0mA		0.4	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =50mA, I _B =5.0mA	·	0.95	V
Current Gain-Bandwidth Product	f⊤	I _c =10mA, V _{cE} =20V f=100MHz	200		MHz
Collector Base Capacitance	Ccb	V _{CB} =5V, I _E =0 f=100KHz		4.5	pF
Noise Figure .	NF	$I_{C}=100\mu A, V_{CE}=5V$ $R_{S}=1K\Omega,$		5	dB
		f=10Hz to 15.7KHz		,	

^{*} Pulse Test: Pulse Width≤300µs, Duty Cycle≤2%



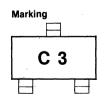
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CBO}	-25	٧
Collector-Emitter Voltage	· V _{CEO}	-25	V
Emitter-Base Voltage	V _{EBO}	-4	V
Collector Current	lc ·	-200	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C
Thermal Resistance Junction to Ambient	Rth(j-a)	357	°C/W



Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =-10μA, I _E =0	-25		٧
*Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =-1mA, I _E =0	-25		٧
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_{E} = -10\mu A$, $I_{C} = 0$	-4		
Collector Cutoff Current	I _{CBO}	$V_{CB}=-20V$, $I_E=0$		50	nΑ
Emitter Cutoff Current	I _{EBO}	$V_{BE} = -3V, I_{C} = 0$		-50	nΑ
*DC Current Gain	h _{FE}	$V_{CE}=-1V$, $I_{C}=-2mA$	120	360	
		$V_{CE}=-1V$, $I_{C}=-50mA$	60		
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = -50 \text{mA}, I_B = -5 \text{mA}$		-0.4	٧
*Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_C = -50 \text{mA}, I_B = -5 \text{mA}$		-0.95	V
Current Gain-Bandwidth Product	f _T	$V_{CE} = -20V$, $I_{C} = -10mA$, $f = 100MHz$	250		MHz
Collector Input Capacitance	Cib	$V_{BE} = -0.5V$, $I_{C} = 0$, $f = 1 MHz$. •	10	рF
Collector-Base Capacitance	Ccb	$V_{CB}=-5V$, $I_E=0$, $f=1MHz$		4.5	рF
Noise Figure	NF	$V_{CE} = -5V$, $I_{C} = -100\mu A$, $Rs = 1k\Omega$		4	dB
		Noise Bandwidth=10Hz to 15.7KHz			

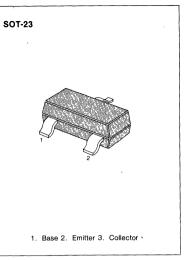
^{*} Pulse Test: PW≤300µs, Duty Cycle≤2%



SWITCHING TRANSISTOR

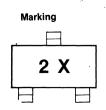
ABSOLUTE MAXIMUM RATINGS ($T_a = 25$ °C)

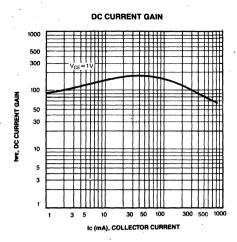
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Storage Temperature	V _{CBO} V _{CEO} V _{EBO} Ic P _C Tstg	60 40 6 600 350 150	V V V mA mW

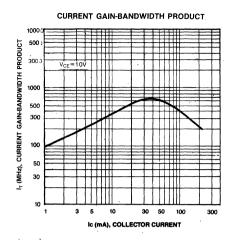


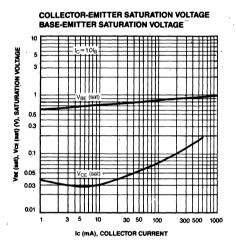
Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =100μA, I _E =0	60		V
*Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =1.0mA, I _B =0	40		V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 100 \mu A, I_C = 0$	6		V
Base Cutoff Current	I _{BEV}	V _{CE} =35V, V _{EB} =0.4V		100	nA
Collector Cutoff Current	I _{CEX}	V _{CE} =35V, V _{BE} =0.4V	1	100	nA
*DC Current Gain	h _{FE}	$V_{CE}=1V$, $I_{C}=0.1$ mA	20	1	`
•	*	$V_{CE}=1V$, $I_{C}=1mA$	40	}	
		$V_{CE}=1V$, $I_{C}=10mA$	80		
		V _{CE} =1V, I _C =150mA	100	300	
		V _{CE} =2V, I _C =500mA	40		
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =150mA, I _B =15mA		0.4	V
	ĺ	I _C =500mA, I _B =50mA		0.75	· v
*Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =150mA, I _B =15mA	0.75	0.95	V
•		I _C =500mA, I _B =50mA		1.2	V
Current Gain-Bandwidth Product	f⊤	I _C =20mA, V _{CE} =10V	250		MHz
		f=100MHz			
Collector Base Capacitance	Ccb	$V_{CB}=5V$, $I_{E}=0$		6.5	pF
	İ	f=100KHz			
Turn On Time	ton	V_{CC} =30V, V_{BE} =2V		35	ns
		$I_C = 150 \text{mA}, I_{B1} = 15 \text{mA}$	1		
Turn Off Time	toff	V _{CC} =30V, I _C =150mA		255	ns
		$I_{B1} = I_{B2} = 15 \text{mA}$			

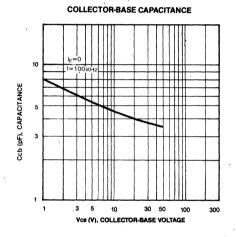
^{*}Pulse Test: Pulse Width≤300µs, Duty Cycle≤2%







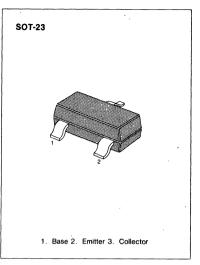




SWITCHING TRANSISTOR

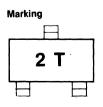
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

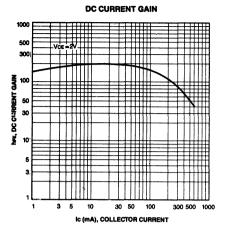
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	40	V
Collector-Emitter Voltage	V _{CEO}	40	V
Emitter-Base Voltage	V_{EBO}	5	V
Collector Current	I _C	600	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C

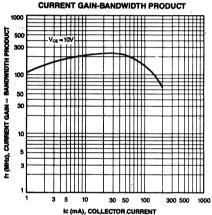


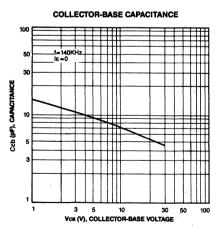
Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =0.1mA, I _E =0	40		V
*Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =1.0mA, I _B =0	40		· v
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 0.1 \text{ mA}, I_C = 0$	5		V
Base Cutoff Current	I _{BEV}	$V_{CE} = 35V, V_{BE} = 0.4V$		0.1	μΑ
Collector Cutoff Current	I _{CEX}	$V_{CE} = 35V, V_{BE} = 0.4V$		0.1	μΑ
DC Current Gain	- h _{FE}	V _{CE} =1V, I _C =0.1mA	30		
• • • •		$V_{CE}=1V$, $I_{C}=1.0mA$	60		
•		$V_{CE}=1V$, $I_{C}=10mA$	100		
•		$V_{CE} = 2V, I_{C} = 150 \text{mA}$. 100	300	
•		*V _{CE} =2V, I _C =500mA	20		-
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 150 \text{mA}, I_{B} = 15 \text{mA}$		0.4	V
	,	I _C =500mA, I _B =50mA	1	0.75	V
*Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_{C} = 150 \text{mA}, I_{B} = 15 \text{mA}$	0.75	0.95	V
•	,,	I _C =500mA, I _B =50mA		1.3	V
Current Gain-Bandwidth Product	. f _⊤	I _C =20mA, V _{CF} =10V	200		MHz
		f=100MHz			
Collector-Base Capacitance	Ccb	V _{CB} =1.0V, I _E =0		8.5	pF
	Job	f=140kHz			·
Turn On Time	ton	$V_{CC}=30V$, $V_{BE}=2V$		35	ns
		I _C =150mA, I _{R1} =15mA			
Turn Off Time	toff	V _{cc} =30V, I _c =150mA		255	ns
		I _{B1} =I _{B2} =15mA			117

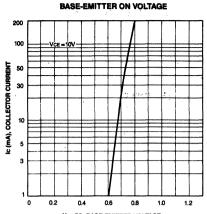
^{*}Pulse Test: Pulse Width≤300µs, Duty Cycle≤2%

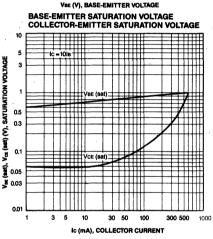








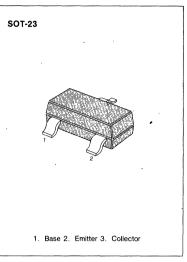




LOW NOISE TRANSISTOR

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	V
Collector-Emitter Voltage	V _{CEO} .	50	V
Emitter-Base Voltage	V_{EBO}	3	V
Collector Current	Ic	50	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°.C

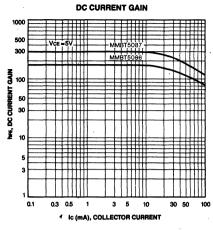


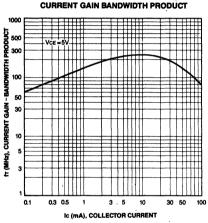
ELECTRICAL CHARACTERISTICS (Ta=25°C)

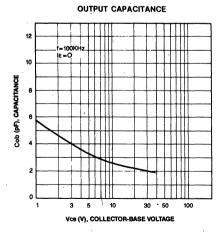
Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C}=100\mu A, I_{E}=0$	50		V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C=1$ mA, $I_B=0$	50		V
Collector Cutoff Current	I _{CBO}	$V_{CB} = 35V, I_{E} = 0$		50	nA
DC Current Gain	h _{FE}	$V_{CE} = 5V, I_{C} = 100 \mu A$	150	500	
		$V_{CE}=5V$, $I_{C}=1mA$	150		
		$V_{CE}=5V$, $I_{C}=10mA$	150		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1mA		0.3	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =10mA, I _B =1mA		0.85	V
Current Gain-Bandwidth Product	f _T	I _C =500μA, V _{CE} =5V	40		MHz
		f=20MHz	.	,	
Output Capacitance	Cob	V _{CB} =5V, I _E ≐0		4	pF
		f=100kHz			
Noise Figure	NF	I _C =100μA, V _{CE} =5V		3	dB
		$f=1$ KHz, $R_S=3$ K Ω			

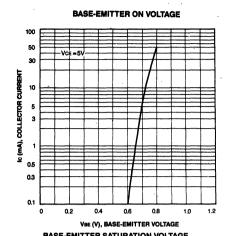
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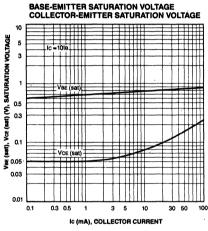










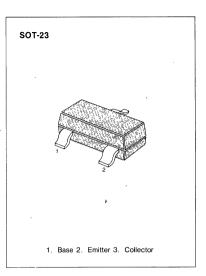


LOW NOISE TRANSISTOR

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current	V _{CBO} V _{CEO} V _{EBO} I _C	50 50 3 50	V V V mA
Collector Dissipation Storage Temperature	P _c Tstg	350 150	mW °C

[•] Refer to MMBT5086 for graphs



ELECTRICAL CHARACTERISTICS (Ta=25°C)

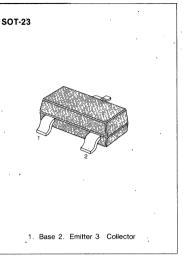
Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =100μA, I _E =0	50		V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C}=1 \text{ OmA}, I_{B}=0$	50		V .
Collector Cutoff Current	I _{CBO}	V _{CB} =35V, I _E =0		50	nA
DC Current Gain	h _{FE}	$V_{CE} = 5V$, $I_{C} = 100 \mu A$	250	800	
		$V_{CE}=5V$, $I_{C}=1.0mA$	250		
		$V_{CE} = 5V, I_{C} = 10mA$	250		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C=10mA$, $I_B=1.0mA$		0.3	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_C=10\text{mA}, I_B=1.0\text{mA}$		0.85	V
Current Gain-Bandwidth Product	f _⊤	I _C =500μA, V _{CE} =5V f=20MHz	40		MHz
Output Capacitance	Cob	$V_{CB}=5V$, $I_E=0$		4.0	рF
		f=100kHz			
Noise Figure	NF.	$V_{CE}=5V$, $I_{C}=20mA$		2	dB
		$R_S=10K\Omega$			
		f=10Hz to 15.7KHz			
		$V_{CE} = 5V, I_{C} = 100 \mu A$		2	dB
		$R_s=3K\Omega$, $f=1KHz$			

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LOW NOISE TRANSISTOR

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	. V _{CBO}	35	V
Collector-Emitter Voltage	V _{CEO}	30	V
Emitter-Base Voltage	V _{EBO}	4.5	V
Collector Current	l _C	50	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C

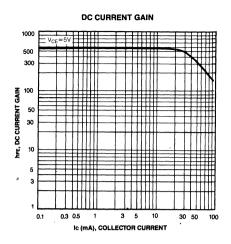


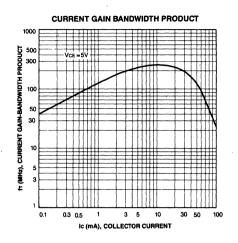
ELECTRICAL CHARACTERISTICS (Ta=25°C)

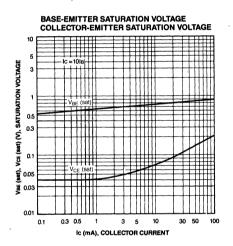
Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =100μA, I _E =0	35		V
Collector-Emitter Breakdown Voltage	BV_CEO	$I_C = 1 \text{ mA}$. $I_B = 0$	30	*	V
Collector Cutoff Current	I _{CBO}	V _{CB} =20V, I _E =0		50	nA
Emitter Cutoff Current	I _{EBO}	V _{BE} =3V, I _C =U		50	nA
DC Current Gain	h _{FE}	$V_{CE} = 5V, I_{C} = 100 \mu A$	300	900	
		$V_{CE}=5V$, $I_{C}=1$ mA	350		
4		$V_{CE}=5V$, $I_{C}=10mA$	300		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = 1 \text{ OmA}, I_B = 1.0 \text{mA}$		0.5	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_C = 10 \text{mA}, I_B = 1.0 \text{mA}$		0.8	V
Current Gain-Bandwidth Product	f _T	I _C =500μA, V _{CE} =5V f=20MHz	50		MHz
Collector Base Capacitance	Ccb	$V_{CB}=5V$, $I_{E}=0$ f=100kHz		4	, pF
Noise Figure	NF	$I_C = 100 \mu A$, $V_{CE} = 5V$		3	dB
, ·		$R_s = 10 \text{ K}\Omega$ f = 10 Hz to 15.7 KHz			

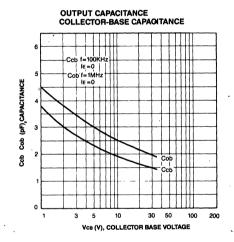
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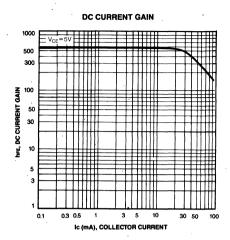
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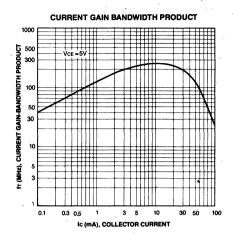


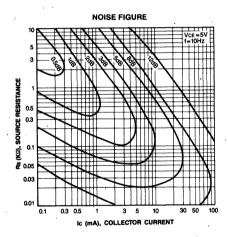












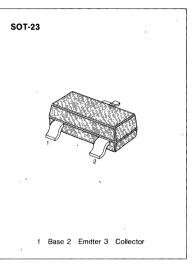
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LOW NOISE TRANSISTOR

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	. 30	V
Collector-Emitter Voltage	V _{CEO}	25	V
Emitter-Base Voltage	V _{EBO}	4.5	V
Collector Current	l _c	50	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C

[•] Refer to MMBT5088 for graphs



ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Base Breakdown Voltage	BV_{CBO}	$I_C = 100 \mu A, I_E = 0$	30		٧ .
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C}=1.0\text{mA}, I_{B}=0$	25		V
Collector Cutoff Current	I _{CBO}	$V_{CB} = 15V, I_E = 0$	į	50	nA
Emitter Cutoff Current	I _{EBO}	$V_{BE} = 4.5V, I_{C} = 0$		100	nA
DC Current Gain	h _{FE}	$V_{CE} = 5V, I_{C} = 100 \mu A$	400	1200	
	*	$V_{CE}=5V$, $I_{C}=1mA$	450		
		V _{CE} =5V, I _C =10mA	400		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = 10 \text{mA}, I_B = 1.0 \text{mA}$	1.	0.5	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_{\rm C} = 10 \text{mA}$. $I_{\rm B} = 1.0 \text{mA}$		0.8	V
Current Gain-Bandwidth Product	f⊤	I _C =500μA, V _{CE} =5V f=20MHz	50		MHz
Collector Base Capacitance	Ccb	$V_{CB} = 5.0V, I_E = 0$ f = 100kHz		4	pF
Noise Figure	NF .	$I_C = 100 \mu A$, $V_{CE} = 5V$ $R_S = 10 K Ω$		2	dB
		f=10Hz to 15.7KHz			

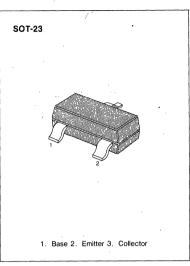
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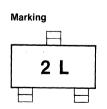
HIGH VOLTAGE TRANSISTOR

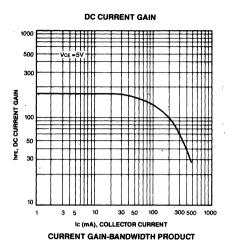
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	160	·V
Collector-Emitter Voltage	V _{CEO}	150	V
Emitter-Base Voltage	V_{EBO}	5	V
Collector Current	lc	500	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C
= :			

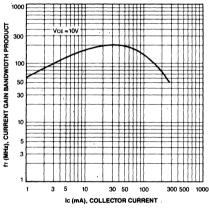


Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =100μA, I _E =0	160		V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 1.0 \text{mA}, I_{B} = 0$	150		· v
Emitter-Base Breakdown Voltage	BV _{EBO} ·	$I_E = 10 \mu A, I_C = 0$	5		V
Collector Cutoff Current	I _{CBO}	V _{CB} =100V, I _E =0		50	nA
DC Current Gain	h _{FE}	$V_{CE}=5V$, $I_{C}=1.0mA$	50		
•		V _{CE} =5V, I _C =10mA	60	· 240	
		V _{CE} =5V, I _C =50mA	50		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1 0mA		0.2	V
		$I_C=50mA$, $I_B=5mA$		0.5	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =10mA, I _B =1.0mA		10	V
		I _C =50mA, I _B =5mA		1.0	V
Current Gain-Bandwidth Product	f _T	I _C =10mA, V _{CE} =10V	100	300	MHz
•		f=100MHz			
Output Capacitance	Cob	$V_{CB}=10V$, $I_E=0$		6.0	pF
•		f=1.0MHz			
Noise Figure	NF	V _{CE} =5V, I _C =200μA		8.C	dB
•		$R_s = 10\Omega$			
		f=10Hz to 15.7KHz			

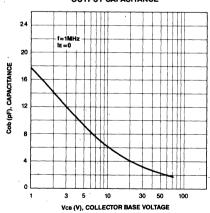


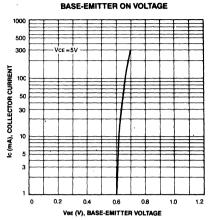


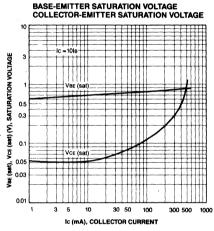




OUTPUT CAPACITANCE



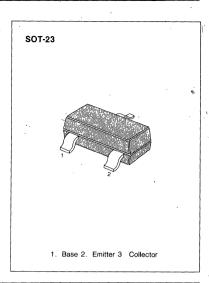




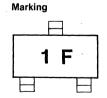
HIGH VOLTAGE TRANSISTOR

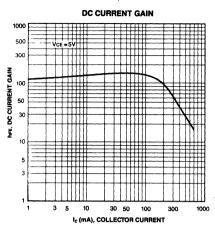
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

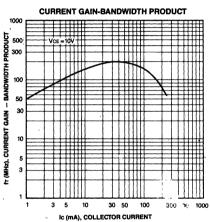
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	160	V
Collector-Emitter Voltage	V _{CEO}	140	V
Emitter-Base Voltage	V _{EBO}	6	V
Collector Current	Ic	600	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C

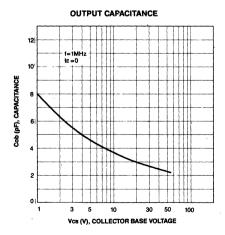


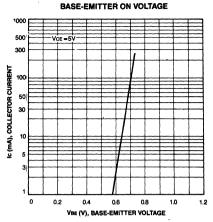
Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C}=10\mu A, I_{E}=0$	160		V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C=1 \text{ mA}, I_B=0$	140		V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	6		V
Collector Cutoff Current	Ісво	$V_{CB} = 100V, I_E = 0$		100	. nA
Emitter Cutoff Current	I _{EBO}	$V_{EB} = 4V, I_{C} = 0$		50	nA
DC Current Gain	h _{FE}	$V_{CE}=5V$, $I_{C}=1.0mA$. 60		
		$V_{CE}=5V$, $I_{C}=10mA$	60	250	
		V _{CE} =5V, I _C =50mA	20		•
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1mA		0.15	V
		$I_C=50mA$, $I_B=5mA$		0.25	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_C = 10 \text{mA}, I_B = 1 \text{mA}$		1.0	V
•		I _C =50mA, I _B =5mA		1.2	V
Current Gain-Bandwidth Product	f⊤	I _C =10mA, V _{CE} =10V	100	300	MHz
		f=100MHz			
Output Capacitance	Cob	$V_{CB}=10V$, $I_E=0$		6.0	pF
		f=1.0MHz			. •

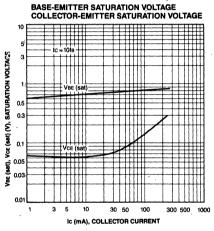








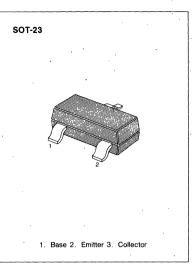




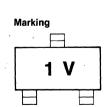
DARLINGTON TRANSISTOR

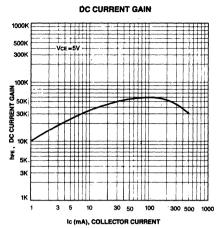
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

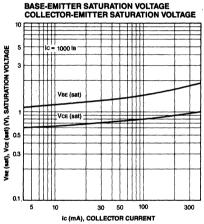
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	40	V
Collector-Emitter Voltage	V _{CEO}	40	V
Emitter-Base Voltage	V _{EBO}	.12	V
Collector Current	· Ic	500	mA
Collector Dissipation	Pc	350 .	mW
Storage Temperature	Tstg	150	°C

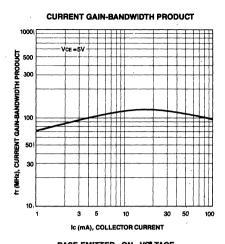


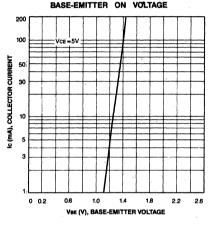
Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 100 \mu A, I_{E} = 0$. 40		V
Collector-Emitter Breakdown Voltage	BV _{CEO}	Ic=10mA, IB=0	40		V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	12		٧
Collector Cutoff Current	Iceo	V _{CB} =30V, I _E =0	,	50	nA
Collector Cutoff Current	ICEO	V _{CE} =25V, I _B =0	'	1	μΑ
Emitter Cutoff Current	· I _{EBO}	$V_{BE} = 10V, I_{C} = 0$		50	nA
DC Current Gain	h _{FE}	$V_{CE}=5V$, $I_{C}=10mA$	10,000	100,000	
		$V_{CE} = 6V, I_{C} = 100mA$	20,000	200,000	
•		$V_{CE} = 5V, I_{C} = 500 \text{mA}$	14,000	140,000	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =50mA I _B =0.5mA		1.2	V
		I _C =500mA, I _B =0.5mA		1.5	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_{C}=500mA, I_{B}=0.5mA$		2.0	V
Base-Emitter On Voltage	V _{BE} (on)	I _C =50mA, V _{CE} =5V		1.75	V
Output Capacitance	Cob	$V_{CB} = 10V, I_{E} = 0$		7	pF
•		f=1MHz		,	
Noise Figure	NF	I _C =1mA, V _{CE} =5V		10	dB
		$R_s=100K\Omega$			
•		f=1KHz to 15.7KHz			•









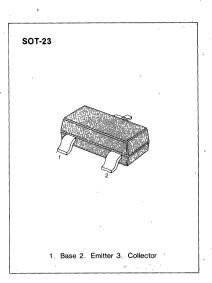


AMPLIFIER TRANSISTOR

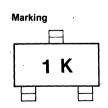
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	60	V
Collector-Emitter Voltage	V _{CEO}	50	V
Emitter-Base Voltage	V _{EBO}	6	V
Collector Current Collector Dissipation Storage Temperature	l _c	200	mA
	P _c	350	mW
	Tstg	150	°C

[•] Refer to MMBT5088 for graphs



Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =0.1mA, I _E =0	60		V.
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C}=1.0mA, I_{B}=0$	50		V
Collector Cutoff Current	I _{CBO}	$V_{CB} = 30V, I_E = 0$		0.01	μΑ
Collector Cutoff Current	ICEO	V _{CE} =30V, I _B =0		0.1	μA
Emitter Cutoff Current	I _{EBO}	$V_{EB} = 5.0V, I_{C} = 0$		0.01	μΑ
DC Current Gain	h _{FE}	$V_{CE} = 5V, I_{C} = 0.01 \text{mA}$	250		
·		$V_{CE} = 5V, I_{C} = 0.1 \text{mA}$	250	650	
		$V_{CE}=5V$, $I_{C}=1.0mA$	250		
		$V_{CE}=5V$, $I_{C}=10mA$	250		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =0.5mA		0.2	V
		I _C =100mA, I _B =5mA		0.6	V
Base-Emitter On Voltage	V _{BE} (on)	Ic=1mA, Vc=5V	0.56	0.66	V
Current Gain-Bandwidth Product	f⊤	Ic= 1.0mA, VcE=5V	100	700	MHz
		f=100MHz			
Output Capacitance	Cob	$V_{CB} = 10V, I_{E} = 0$		3	pF`
		f=1.0MHz			

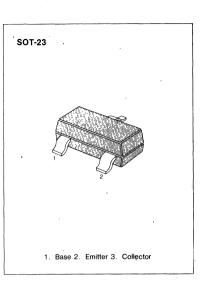


AMPLIFIER TRANSISTOR

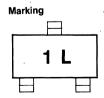
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO} .	. 55	V
Collector-Emitter Voltage	' V _{CEO}	45	V.
Emitter-Base Voltage	V _{EBO}	6	V
Collector Current	l _C	200	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C

[•] Refer to MMBT5088 for graphs



Characteristic `	Symbol	Test Condition	Min	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =0.1mA, I _E =0	55		V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C}=1.0mA, I_{B}=0$	45		V
Collector Cutoff Current	I _{CBO}	$V_{CB} = 30V, I_{E} = 0$		0.01	μΑ
Collector Cutoff Current	I _{CEO}	$V_{CE} = 30V, I_{B} = 0$		0.1	μΑ
Emitter Cutoff Current	I _{EBO}	$V_{EB} = 5.0V, I_{C} = 0$		0.01	μΑ
DC Current Gain	h _{FE}	$V_{CE} = 5V$, $I_{C} = 0.01 \text{ mA}$	500		
		$V_{CE}=5V$, $I_{C}=0.1mA$	500	1250	
		$V_{CE}=5V$, $I_{C}=1.0mA$	500		
		V_{CE} =5V, I_{C} =10mA	500		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C=10mA$, $I_B=0.5mA$		0.2	V
•		$I_C=100$ mA, $I_B=5$ mA		0.6	V
Base-Emitter On Voltage	· V _{BE} (on)	I _C =1mA, V _{CE} =5V	0.56	0.66	V
Current Gain-Bandwidth Product	f⊤	$I_C = 1.0 \text{mA}, V_{CE} = 5 \text{V}$	100	700	MHz
		f=100MHz			
Output Capacitance	Cob	$V_{CB}=10V$, $I_{E}=0$		3	pF
*.		f=1.0MHz			

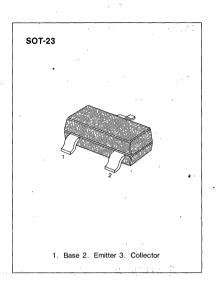


DRIVER TRANSISTOR

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

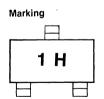
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CBO}	60	V
Collector-Emitter Voltage	V_{CEO}	60	V
Emitter-Base Voltage	V _{EBO}	4	. v
Collector Current (max)	lc	500	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C
Thermal Resistance Junction to Ambient	Rth(j-a)	357	°C/W

Refer to MPSA05 for graphs



Characteristic	Symbol	Test Condition	Min	Max	Unit
*Collector-Emitter Breakdown Voltage	BV _{CEO} 3	I _C =1mA, I _B =0	60		V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 100 \mu A, I_C = 0$	4		V
Collector Cutoff Current	I _{CBO}	$V_{CB}=60V$, $I_{E}=0$		0.1	μA
Collector Cutoff Current	I _{CEO}	$V_{CE}=60V, I_{B}=0$		0.1	μΑ
DC Current Gain	h _{FE}	V _{CE} =1V, I _C =10mA	50		
,		$V_{CE}=1V$, $I_{C}=100mA$	50		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =100mA, I _B =10mA		0.25	V
Base-Emitter On Voltage	V _{BE} (on)	V _{CE} =1V, I _C =100mA .		1.2	,V
Current Gain-Bandwidth Product	f _T	$V_{CE}=2V$, $I_{C}=10$ mA, $f=100$ MHz	100		MHz

^{*} Pulse Test: PW≤300μs, Duty Cycle≤2%

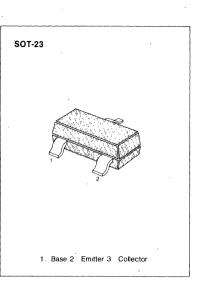


DRIVER TRANSISTOR

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

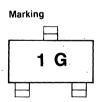
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	80	V
Collector-Emitter Voltage	V _{CEO}	80	V
Emitter-Base Voltage	V _{EBO}	4	V
Collector Current	l _C	500	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C
Thermal Resistance Junction to Ambient	Rth(j a)	357	°C/W

[•] Refer to MPSA05 for graphs



Characteristic	Symbol	Test Condition	Min	Max	Unit
*Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =1mA, I _B =0	80		٧
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_{E}=100\mu A, I_{C}=0$	4		V
Collector Cutoff Current	I _{CBO}	$V_{CB} = 80V, I_{E} = 0$		0.1 .	μΑ
Collector Cutoff Current	ICEO	$V_{CE}=60V$, $I_B=0$		0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE}=1V$, $I_{C}=10mA$	50		
,		$V_{CE} = 1V, I_{C} = 100mA$	50		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C=100mA$, $I_B=10mA$		0.25	٧
Base-Emitter On Voltage	V _{BE} (on)	V _{CE} =1V, I _C =100mA		1.2	V
Current Gain-Bandwidth Product	f _⊤	$V_{CE}=2V$, $I_{C}=10mA$, $f=100MHz$	100		MHz

^{*} Pulse Test: PW≤300µs, Duty Cycle≤2%

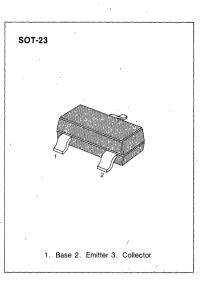


DARLINGTON AMPLIFIER TRANSISTOR

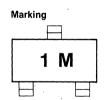
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Storage Temperature	V _{CBO} V _{CES} V _{EBO} I _C P _C Tstg	30 30 10 300 350 150	V V V mA mW

[•] Refer to MMBT6427 for graphs



Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Emitter Breakdown Voltage	I _{B CES}	I _C =100μA, I _B =0	30		V
Collector Cutoff Current	I _{CBO}	$V_{CB} = 30V, I_{E} = 0$		100	nA
Emitter Cutoff Current	I _{EBO}	$V_{EB} = 10V, I_{C} = 0$		100	nA
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =10mA	5,000		
		V _{CE} =5V, I _C =100mA	10,000		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =100mA, I _B =0 1mA		1.5	V
Base-Emitter On Voltage	V_{BE}	$I_C=100mA$, $V_{CE}=5V$		2.0	V
Current Gain-Bandwidth Product	f⊤	$I_C=10mA$, $V_{CE}=5V$	125		MHz
		f=100MHz			

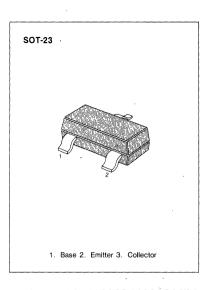


DARLINGTON AMPLIFIER TRANSISTOR

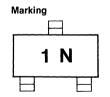
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Storage Temperature	V _{CBO} V _{CES} V _{EBO} I _C P _C Tstg	30 30 10 300 350 150	V V V mA mW

[·] Refer to MMBT6427 for graphs



Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CES}	$I_{C}=100\mu A, I_{B}=0$	30		V
Collector Cutoff Current	I _{CBO}	$V_{CB} = 30V, I_{E} = 0$		100	nA
Emitter Cutoff Current	I _{EBO}	V _{EB} =10V, I _C =0		100	nA
DC Current Gain	h _{FE}	$V_{CE}=5V$, $I_{C}=10mA$	10,000		
		$V_{CE} = 5V, I_{C} = 100mA$	20,000		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C}=100mA, I_{B}=0.1mA$	1	1.5	V
Base-Emitter On Voltage	V_{BE}	$I_C=100$ mA, $V_{CE}=5$ V		2.0	V
Current Gain-Bandwidth Product	f _T	I _C =10mA, V _{CE} =5V	125		MHz
1		f=100MHz			

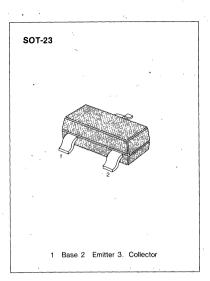


GENERAL PURPOSE TRANSISTOR

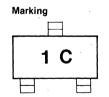
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Storage Temperature	V _{CEO}	40	V
	V _{EBO}	4	V
	I _C	100	mA
	P _C	350	mW
	Tstg	150	°C

[•] Refer to MMBT3904 for graphs



Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =1.0mA, I _B =0	40		V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 100 \mu A, I_C = 0$	4		· V .
Collector Cutoff Current	I _{CBO}	$V_{CB} = 30V, I_{E} = 0$		100	nA
DC Current Gain	h _{FE}	$V_{CE} = 10V, I_{C} = 5mA$	40	400	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = 10 \text{mA}$, $I_B = 1.0 \text{mA}$		0.25	V
Current Gain-Bandwidth Product	f⊤	I _C =5 0mA, V _{CE} =10V	125		MHz
		f=100MHz			
Output Capacitance	Cob	$V_{CB}=10V$, $I_E=0$		4	pF
		f=100KHz]		

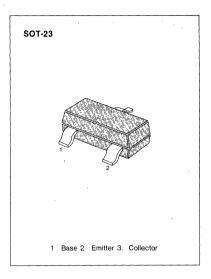


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HIGH VOLTAGE TRANSISTOR

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	300	V
Collector-Emitter Voltage	V _{CEO}	300	V
Emitter-Base Voltage	V _{EBO}	6	V
Collector Current	l _C	500	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C
Thermal Resistance Junction to Ambient	Rth(j-a)	357	°C/W



Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =100μA, I _E =0	300		V
*Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C=1$ mA, $I_B=0$	300		V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 100 \mu A, I_C = 0$	6		٧
Collector Cutoff Current	I _{CBO}	$V_{CB} = 200V, I_{E} = 0$		0.1	μΑ
Emitter Cutoff Current	I _{EBO}	$V_{BE}=6V, I_{C}=0$		0.1	μΑ
*DC Current Gain	h _{FE}	V _{CE} =10V, I _C =1mA	25		
		V _{CE} =10V, I _C =10mA	40		
		$V_{CE}=10V$, $I_{C}=30mA$	40		·
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =20mA, I _B =2mA		0.5	V .
*Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =20mA, I _B =2mA		0.9	V
Current Gain-Bandwidth Product	f _T	$V_{CE}=20V, I_{C}=10mA, f=100MHz$	50		. MHz
Collector-Base Capacitance	Ccb	$V_{CB}=20V$, $I_E=0$, $f=1MHz$		3	pF

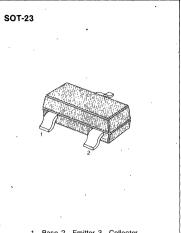
^{*} Pulse Test: PW≤300µs, Duty Cycle≤2%



HIGH VOLTAGE TRANSISTOR

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

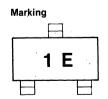
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	200	V
Collector-Emitter Voltage	V_{CEO}	200.	V
Emitter-Base Voltage	V _{EBO}	6	V
Collector Current	l _c	500	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C



1.	Base 2	Emitter 3	Collector

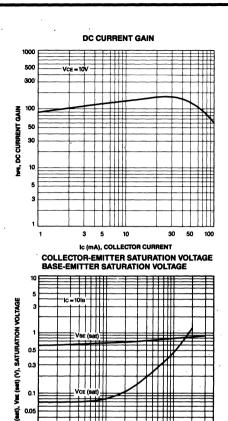
Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Base Breakdown Voltage	BV_{CBO}	$I_{C}=100\mu A$ $I_{E}=0$	200		· V
*Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C=1 \text{ mA}, I_B=0$	200		V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 100 \mu A, I_C = 0$	6		V
Collector Cutoff Current	I _{CBO}	$V_{CB} = 160V, I_{E} = 0$		100	nA
Emitter Cutoff Current	I _{EBO}	$V_{EB} = 4V, I_{C} = 0$	1	100	nA
*DC Current Gain	h _{FE}	$V_{CE}=10V$, $I_{C}=1mA$	25		
•		$V_{CE} = 10V, I_{C} = 10mA$	40		-
,		V _{CE} =10V, I _C =30mA	40		
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C=20mA$, $I_B=2mA$		0.5	V
*Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_C = 20mA$, $I_B = 2mA$		0.9	V
Current Gain-Bandwidth Product	f _T	$I_{C} = 10 \text{mA}, V_{CE} = 20 \text{V}$	50		MHz
		f=100MHz			
Collector-Base Capacitance	Ccb	$V_{CB} = 20V, I_{E} = 0$		4	pF ·
	,	f=1MHz			

^{*}Pulse Test: Pulse Width≤300µs, Duty Cycle≤2%



0.1

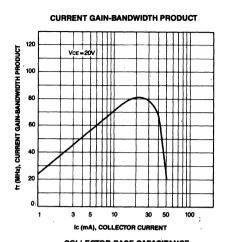
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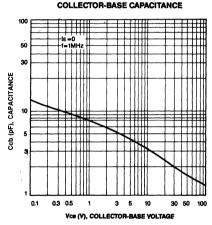


30 50 100

Ic (mA), COLLECTOR CURRENT

300



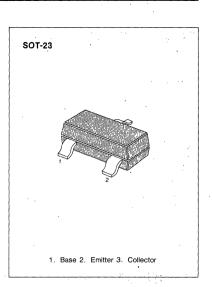


DRIVER TRANSISTOR

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-60	٧
Collector-Emitter Voltage	V _{CEO}	-60	V
Emitter-Base Voltage	V_{EBO}	-4	Ÿ
Collector Current	lc	-500	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C ·
Thermal Resistance Junction to Ambient	Rth(j-a)	357	°C/W

[•] Refer to MPSA55 for graphs



Characteristic	Symbol	Test Condition	Min	Max	Unit
*Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C = -1 \text{ mA}, I_B = 0$	-60		٧
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = -100 \mu A$, $I_C = 0$	4		V
Collector Cutoff Current	I _{CBO}	$V_{CB} = -60V, I_{E} = 0$		-0.1	μΑ
Collector Cutoff Current	I _{CEO}	$V_{CE} = -60V, I_{B} = 0$		-0.1	μΑ
DC Current Gain	h _{FE}	$V_{CE}=-1V$, $I_{C}=-10mA$	50		
'		$V_{CE} = -1V$, $I_{C} = -100$ mA	50		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -100 \text{mA}, I_{B} = -10 \text{mA}$		-0.25	V
Base-Emitter On Voltage	V _{BE} (on)	$V_{CE} = -1V$, $I_{C} = -100mA$		-1.2	V
Current Gain-Bandwidth Product	f⊤	$V_{CE} = -1V$, $I_{C} = -100$ mA, $f = 100$ MHz	50		MHz

^{*} Pulse Test: PW≤300μs, Duty Cycle≤2%



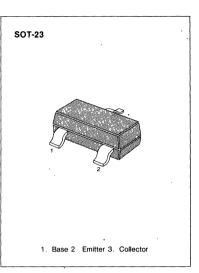
$^{\circ}$

DRIVER TRANSISTOR

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

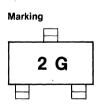
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-80	٧
Collector-Emitter Voltage	V _{CEO}	-80	V
Emitter-Base Voltage	V _{EBO}	-4	V
Collector Current ,	l _c	-500	mA
Collector Dissipation	Pc	350 -	mW
Storage Temperature	Tstg	150	°C
Thermal Resistance Junction to Ambient	Rth(j-a)	357	°C/W

[•] Refer to MPSA55 for graphs



Characteristic	Symbol	Test Condition	Min	Max	Unit
*Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =-1mA, I _B =0	-80		٧
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = -100 \mu A, I_C = 0$	-4		V
Collector Cutoff Current	I _{CBO}	$V_{CB} = -80V, I_{E} = 0$		-0.1	μΑ
Collector Cutoff Current	ICEO	$V_{CE} = -60V, I_B = 0$		· -0.1.	μΑ
DC Current Gain	h _{FE}	$V_{CE} = -1V$, $I_{C} = -10mA$	50		1
		$V_{CE} = -1V$, $I_{C} = -100mA$	50		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -100 \text{mA}, I_{B} = -10 \text{mA}$		-0.25	V .
Base-Emitter On Voltage	V _{BE} (on)	$V_{CE} = -1V$, $I_{C} = -100mA$		-1.2	V
Current Gain-Bandwidth Product	f _T	$V_{CE} = -1V$, $I_{C} = -100$ mA, $f = 100$ MHz	50		MHz
	1		1	1)

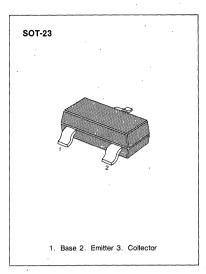
^{*} Pulse Test: PW≤300μs, Duty Cycle≤2%



DARLINGTON TRANSISTOR

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

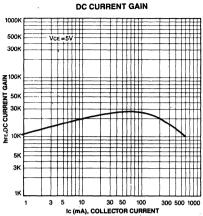
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	30	V
Collector-Émitter Voltage	V _{CES}	30	V
Emitter-Base Voltage	V _{EBO}	10	V
Collector Current	l _C	500	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C
	_		1

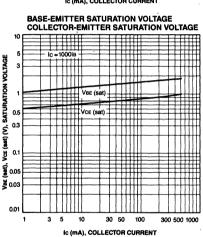


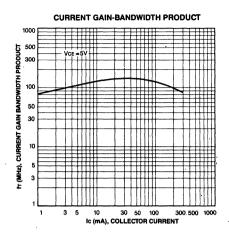
Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Emitter Breakdown Voltage Collector Cutoff Current Emitter Cutoff Current *DC Current Gain Collector-Emitter Saturation Voltage Base-Emitter On Voltage Current Gain-Bandwidth Product	BV _{CES} I _{CBO} I _{EBO} h _{FE} V _{CE} (sat) V _{BE} (on) f _T	$\begin{array}{c} I_{C}\!=\!100\mu\text{A}\ I_{B}\!=\!0\\ V_{CB}\!=\!30V,\ I_{B}\!=\!0\\ V_{BE}\!=\!10V,\ I_{C}\!=\!0\\ V_{CE}\!=\!5V,\ I_{C}\!=\!100\text{MA}\\ I_{C}\!=\!100\text{MA},\ I_{B}\!=\!0.1\text{mA}\\ I_{C}\!=\!100\text{MA},\ V_{CE}\!=\!5V\\ I_{C}\!=\!10\text{MA},\ V_{CE}\!=\!50V\\ I_{C}\!=\!100\text{MHz} \end{array}$	5,000 10,000	100 100 1.5 2	V nA nA · V V MHz

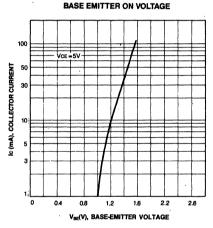
^{*}Pulse Test: Pulse Width≤300µs, Duty Cycle≤2%











DARLINGTON TRANSISTOR

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage	V _{ČBO} V _{CES}	30	V
Emitter-Base Voltage	V _{EBO}	10	V
Collector Current Collector Dissipation	l _c P _c	500 350	mA mW
Storage Temperature	Tstg	150	°C

[•] Refer to MMBTA63 for graphs

SOT-23 1. Base 2. Emitter 3. Collector

Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CES}	$I_{C} = 100 \mu A, I_{B} = 0$	30		V
Collector Cutoff Current ·	I _{CBO}	V _{CB} =30V, I _E =0		100	´ nA
Emitter Cutoff Current	I _{EBO}	$V_{BE} = 10V, I_{C} = 0$		100	nA
*DC Current Gain	h _{FE}	$V_{CE}=5V$, $I_{C}=10mA$	10,000		
	!	$V_{CE} = 5V, I_{C} = 100mA$	20,000		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =100mA, I _B =0.1mA		1.5	V
Base-Emitter On Voltagè	V_{BE} (on)	I _C =100mA V _{CE} =5V		2	V
Current Gain-Bandwidth Product	f⊤	I _C =10mA, V _{CE} =50V	125		MHz
,		f=100MHz			

^{*}Pulse Test: Pulse Width≤300µs, Duty Cycle≤2%



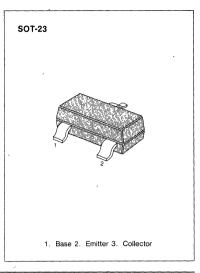
E

AMPLIFIER TRANSISTOR

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Storage Temperature	V _{CEO} V _{EBO} I _C P _C Tstg	40 4 100 350 150	V V mA mW °C

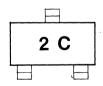
[•] Refer to MMBT5086 for graphs



ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Emitter Breakdown Voltage Emitter-Base Breakdown Voltage Collector Cutoff Current DC Current Gain Collector-Emitter Saturation Voltage Current Gain-Bandwidth Product	$\begin{array}{c} BV_{CEO} \\ BV_{EBO} \\ I_{CBO} \\ h_{FE} \\ V_{CE} \ (sat) \\ f_T \end{array}$	$\begin{array}{c} I_{C}\!=\!1.0\text{mA},\ I_{B}\!=\!0 \\ I_{E}\!=\!100\mu\text{A},\ I_{C}\!=\!0 \\ V_{CB}\!=\!30\text{V},\ I_{E}\!=\!0 \\ V_{CE}\!=\!10\text{V},\ I_{C}\!=\!5.0\text{mA} \\ I_{C}\!=\!10\text{mA},\ I_{B}\!=\!1.0\text{mA} \\ I_{C}\!=\!5.0\text{mA},\ V_{CE}\!=\!10\text{V} \\ f\!=\!100\text{MHz} \end{array}$	40 4 40 125	100 400 0.25	V V nA V MHz
Output Capacitance	Cob	$V_{CB}=10V, I_{E}=0$ f=100KHz		4.0	pF

Marking

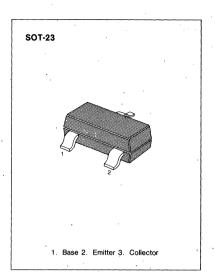


HIGH VOLTAGE TRANSISTOR

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-300	٧.
Collector-Emitter Voltage	V _{CEO}	-300	V
Emitter-Base Voltage	V _{EBO}	-5	V
Collector Current	lc	-500	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°C.
Thermal Resistance Junction to Ambient	Rth(j-a)	357	°C/Ŵ

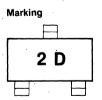
[•] Refer to MPSA92/93 for graphs



ELECTRICAL CHARACTERISTICS (T_a=25°C)

Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = -100\mu A, I_{E} = 0$	-300		V
*Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -1 \text{mA}, I_{B} = 0$	-300		V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = -100 \mu A$, $I_C = 0$	-5		V.
Collector Cutoff Current	I _{CBO}	$V_{CB} = -200V, I_{E} = 0$		-0.25	μΑ
Emitter Cutoff Current	I _{EBO}	$V_{BE} = -3V, I_{C} = 0$		-0.1	μΑ
*DC Current Gain	h _{FE}	$V_{CE} = -10V, I_{C} = -1mA$	25		
		$V_{CE} = -10V, I_{C} = -10mA$	40		
		$V_{CE} = -10V, I_{C} = -30mA$	25		
* Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = -20 \text{mA}, I_B = -2 \text{mA}$		-0.5	V
* Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_{C} = -20 \text{mA}, I_{B} = -2 \text{mA}$		-0.9	V
Current Gain-Bandwidth Product	f _T	$V_{CE} = -20V$, $I_C = -10mA$, $f = 100MHz$	50		MHz
Collector-Base Capacitance	Ccb	$V_{CB}=-20V$, $I_{E}=0$, $f=1MHz$		6	pF

^{*} Pulse Test: PW≤300µs, Duty Cycle≤2%

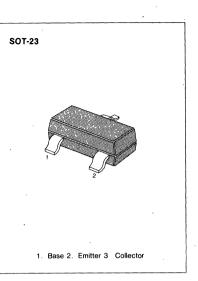


HIGH VOLTAGE TRANSISTOR

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

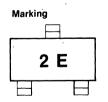
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-200	V
Collector-Emitter Voltage	· V _{CEO}	-200	V
Emitter-Base Voltage	V_{EBO}	-5	V
Collector Current	l _c	-500	mA
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	. °C
Thermal Resistance Junction to Ambient	Rth(j-a)	357	°C/W

[•] Refer to MPSA92/93 for graphs



Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = -100\mu\text{A}, I_{E} = 0$	-200		٧
*Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C = -1 \text{ mA}, I_B = 0$	-200		V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = -100 \mu A, I_C = 0$	-5		, v
Collector Cutoff Current	Ісво	$V_{CB} = -160V, I_{E} = 0$		-0.25	μΑ
Emitter Cutoff Current	I _{EBO}	$V_{BE} = -3V, I_{C} = 0$		-0.1	μΑ
* DC Current Gain	h _{FE}	$V_{CE} = -10V, I_{C} = -1mA$	25		
		$V_{CE} = -10V, I_{C} = -10mA$	40		
	ļ	$V_{CE} = -10V, I_{C} = -30mA$	25		
* Collector-Emitter Saturation Voltage-	V _{CE} (sat)	$I_C = -20 \text{mA}, I_B = -2 \text{mA}$		-0.5	V
* Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_C = -20 \text{mA}, I_B = -2 \text{mA}$		0.9	V
Current Gain-Bandwidth Product	f⊤	$V_{CE} = -20V$, $I_{C} = -10mA$, $f = 100MHz$	50		. MHz
Collector-Base Capacitance	Ccb	$V_{CB} = -20V$, $I_E = 0$, $f = 1 MHz$		- 8	рF

^{*} Pulse Test: PW≤300µs, Duty Cycle≤2%

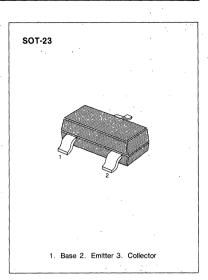


VHF/UHF TRANSISTOR

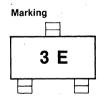
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	30	v ·
Collector-Emitter Voltage	V _{CEO}	25	V
Emitter-Base Voltage	V _{EBO}	3	V
Collector Dissipation	Pc	350	mW
Storage Temperature	Tstg	150	°Ç
Thermal Resistance Junction to Ambient	Rth(j-a)	357	°C/W
			1

[•] Refer to MPSH10/11 for graphs



Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =100μA, I _E =0	30		. v
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =1mA, I _B =0	25		V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_{E}=10\mu A, I_{C}=0$	3		V
Collector Cutoff Current	I _{CBO}	V _{CB} =25V, I _E =0		100	'nΑ
Emitter Cutoff Current	I _{EBO}	$V_{BE}=2V, I_{C}=0$.100	nA
DC Current Gain	h _{FE}	V _{CE} =10V, I _C =4mA	60		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C=4mA$, $I_B=0.4mA$		0.5	V
Base-Emitter On Voltage	V _{BE}	V _{CE} =10V, I _C =4mA		0.95	· V
Current Gain-Bandwidth Product	f⊤	$V_{CE}=10V$, $I_{C}=4mA$, $f=100MHz$	650	,	MHz
Collector-Base Capacitance	Ccb	$V_{CB} = 10V, I_E = 0, f = 1MHz$	1 .	0.7	pF
Common-Base Feedback Capacitance	Crb	$V_{CB}=10V$, $I_E=0$, $f=1MHz$		0.65	pF
Collector Base Time Constant	Cc∙rbb'	$V_{CB}=10V$, $I_{C}=4mA$, $f=31.8MHz$		9	ps



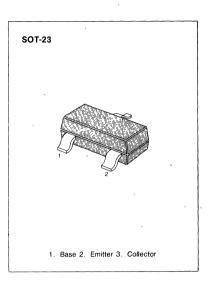
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VHF MIXER TRANSISTOR

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

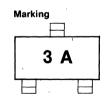
Characteristic	Symbol	Rating	Unit	
Collector-Base Voltage	V _{CBO}	40	V	
Collector-Emitter Voltage	V _{CEO}	30	V	
Emitter-Base Voltage	V _{EBO}	4	V	
Collector Current	l _C	100	mA	
Collector Dissipation	P _C	350	mW	
Storage Temperature	Tstg	150	°C	
Thermal Resistance Junction to Ambient	Rth(j-a)	357	°C/W	

[·] Refer to MPSH24 for graphs,



Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =100μA, I _E =0	40			٧
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =1mA, I _B =0	30			V
Emitter-Base Breakdown Voltage	BV _{EBO} ·	$I_E = 10 \mu A, I_C = 0$	4			V
Collector Cutoff Current	I _{CBO}	V _{CB} =15V, I _E =0			- 50	nA
DC Current Gain	h _{FE}	V _{CE} =10V, I _C =8mA	30			
*Current Gain-Bandwidth Product	f _T	V _{CE} =10V, I _C =8mA f=100MHz	400	620		MHz
Collector-Base Capacitance	Ccb	$V_{CB} = 10V, I_E = 0, f = 1 MHz$		0.25	0.36	pF
Conversion Gain (213MHz to 45MHz)	C _G	I _C =8mA, V _{CC} =20V Oscillator Injection=150mV	19	24		dB
(60MHz to 45MHz)		Coomacor Injection 100mv	24	29		dB

^{*} Pulse Test: PW≤300µs, Duty Cycle≤2%

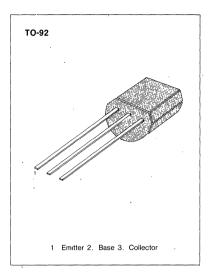


GENERAL PURPOSE TRANSISTOR

- Collector-Emitter Voltage: V_{CEO} = 30V
- Collector Dissipation: Pc (max)=625mW

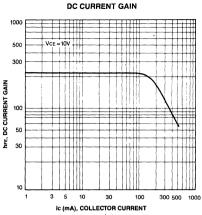
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

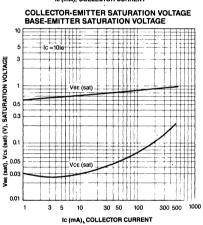
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage	V _{CBO} V _{CEO} V _{EBO}	60 30 5	V V
Collector Current Collector Dissipation Junction Temperature Storage Temperature	Ic Pc Tj Tstg	600 625 150 -55~150	mA mW °C °C

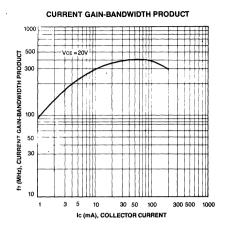


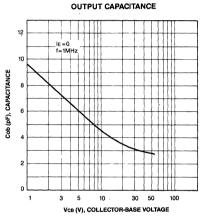
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 10 \mu A, I_{E} = 0$	60			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C = 10 \text{mA}, I_B = 0$	30		ļ	- V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	5		ŀ	V
Collector Cut-off Current	I _{CBO} .	$V_{CB} = 50V, I_E = 0$			10	nA
DC Current Gain	h _{FE}	$I_{C} = 0.1 \text{mA}, V_{CE} = 10 \text{V}$	35		1	
	1	$I_C = 1mA$, $V_{CE} = 10V$	50			
		$I_{C} = 10 \text{mA}, V_{CE} = 10 \text{V}$	75			
	1	*I _C =150mA, V _{CE} =10V	100		300	
•	1	*I _C = 500mA, V _{CE} = 10V	30		1	İ
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 150 \text{mA}, I_{B} = 15 \text{mA}$			0.4	V
,		$I_{C} = 500 \text{mA}, I_{B} = 50 \text{mA}$			1.6	A
*Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_{C} = 150 \text{mA}, I_{B} = 15 \text{mA}$			1.3	V
<u>.</u>		$I_{C} = 500 \text{mA}, I_{B} = 50 \text{mA}$			2.6	V
Output Capacitance	Cob	$V_{CB} = 10V, I_{E} = 0, f = 1MHz$			8	pF
Current Gain Bandwidth Product	f _T	$I_C = 20 \text{mA}, V_{CE} = 20 \text{V}$	250			MHz
		f=100MHz				
Turn On Time	ton	$V_{CC} = 30V, V_{BE} = 0.5V$,	35	ns
•		I _C =150mA, I _{B1} =15mA				
Turn Off Time	toff	$V_{CC} = 30V, I_{C} = 150mA$			285	ns
		I _{B1} =1 _{B2} =15mA			1	į.

^{*} Pulse Test: Pulse Width ≤ 300µs, Duty Cycle ≤ 2% Also available as a PN2222









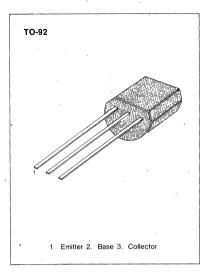
• Collector-Emitter Voltage: V_{CEO} = 40V

• Collector Dissipation: Pc (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Junction Temperature Storage Temperature	VCBO VCEO VEBO Ic Pc Tj	75 40 6 600 625 150 –55~150	V V V mA mW °C °C

^{*}Refer to MPS2222 for graphs



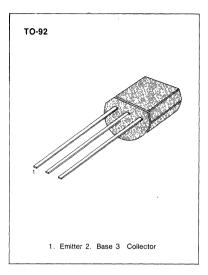
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 10 \mu A, I_{E} = 0$	75			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 10 \text{mA}, I_{B} = 0$	40		,	V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	6 .			V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 60V, I_E = 0$			0.01	μA
Emitter Cutoff Current	I _{EBO}	$V_{EB} = 3V, I_{C} = 0$			10	nA
DC Current Gain	h _{FE}	$I_{\rm C} = 0.1 \text{mA}, V_{\rm CE} = 10 \text{V}$	35			
		$I_C = 1mA$, $V_{CE} = 10V$	50		,	
		$I_{C} = 10 \text{mA}, V_{CE} = 10 \text{V}$	75			ļ
•		*I _C =150mA, V _{CE} =10V	100		300	
		*I _C = 500mA, V _{CE} = 10V	40		}	
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = 150 \text{mA}, I_B = 15 \text{mA}$		}	0.3	٧.
		$I_{C} = 500 \text{mA}, I_{B} = 50 \text{mA}$			1	V
*Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_{C} = 150 \text{mA}, I_{B} = 15 \text{mA}$		0.6	1.2	V
		I _C =500mA, I _B =50mA			2	V
Current Gain Bandwidth Product	f _T	I _C =20mA, V _{CE} =20V f=100MHz	300			MHz
Output Capacitance	Cob	$V_{CB} = 10V$, $I_E = 0$, $f = 1MHz$		}	8	pF
Turn On Time	ton	V _{cc} =30V. I _c =150mA			35	ns
		$I_{B1} = 15 \text{mA}, V_{BE} (\text{off}) = 0.5 \text{V}$				
Turn Off Time	toff	V _{CC} =30V, I _C =150mA			285	ns
	1 7	$I_{B1} = I_{B2} = 15 \text{mA}$				
Noise Figure	NF	$I_{C} = 100 \mu A$, $V_{CF} = 10V$		1	4	dB
		$R_s = 1K\Omega$, $f = 1KHz$				

^{*} Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2% Also available as a PN2222A

- Collector-Emitter Voltage: V_{CEO} = 40V
- Collector Dissipation: Pc (max)=625mW

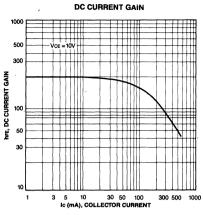
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

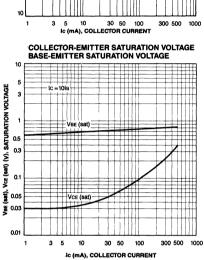
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	60	V
Collector-Emitter Voltage	V _{CEO}	40	V
Emitter-Base Voltage	V _{EBO}	5	V
Collector Current	lc	600	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	Tj	150	· °C
Storage Temperature	Tstg	-55~150	°C

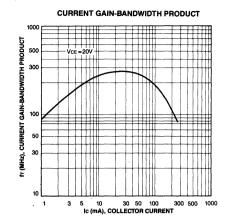


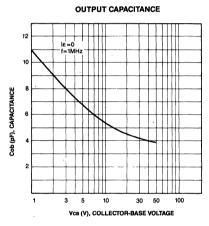
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 10 \mu A, I_{E} = 0$	60			V
*Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =10mA, I _B =0	40			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A$, $I_C = 0$	5			V
Collector Cut-off Current	I _{CBO}	V _{CB} =50V, I _E =0			20	nΑ
DC Current Gain	h _{FE}	i _C =0.1mA, V _{CE} =10V	35			
		I _C =1mA, V _{CE} =10V	50			
·	}	I _C = 10mA, V _{CE} = 10V	75			İ
	1	*I _C =150mA, V _{CE} =10V	100		300	1
	ł	*I _C =500mA, V _{CE} =10V	30			
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =150mA, I _B =15mA			0.4	V
_		I _C =500mA, I _B =50mA			1.6	V
*Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =150mA, I _B =15mA			1.3	V
	,	$I_{C} = 500 \text{mA}, I_{B} = 50 \text{mA}$	ŀ		2.6	V
Output Capacitance	Cob	V _{CB} = 10V, I _E = 0	1		8	pF
,		f=1MHz				1
*Current Gain Bandwidth Product	f _⊤ .	I _C =50mA, V _{CE} =20V	200		l	MHz
		f=100MHz				
Turn On Time	ton	V _{CC} =30V, I _C =150mA			45	ns
		I _{B1} =15mA	-		1	
Turn Off Time	toff	V _{CC} =6V, I _C =150mA	1		100	ns
		$I_{B1} = I_{B2} = 15 \text{mA}$				

^{*} Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2% Also available as a PN2907







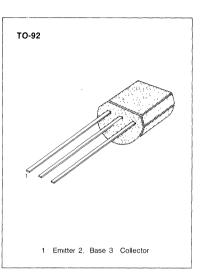


Collector-Emitter Voltage: V_{CEO} = 60V
 Collector Dissipation: P_C (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	60	V
Collector-Emitter Voltage	V _{CEO}	60	V
Emitter-Base Voltage	V _{EBO}	5	V
Collector Current	Ic	600	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	T.i	150	°C
Storage Temperature	Tstg	~55 ~ 150	°C

[•] Refer to MPS2907 for grophs



Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 10 \mu A, I_{E} = 0$	60			V
*Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{\rm C} = 10 \text{mA}, I_{\rm B} = 0$	60			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	5			V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 50V, I_{E} = 0$			10	nA
DC Current Gain	h _{FE}	$I_{\rm C} = 0.1 \text{mA}, V_{\rm CE} = 10 \text{V}$	75		1	
)	$I_C = 1mA$, $V_{CE} = 10V$	100			
		$I_C = 10 \text{mA}, V_{CE} = 10 \text{V}$	100			
		$*I_{C} = 150 \text{mA}, V_{CE} = 10 \text{V}$	100		300	1
	}	$^*I_C = 500 \text{mA}, V_{CE} = 10 \text{V}$	50			
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{\rm C} = 150 \text{mA}, I_{\rm B} = 15 \text{mA}$			0.4	V
		$I_{\rm C} = 500 \text{mA}, I_{\rm B} = 50 \text{mA}$			1.6	V
*Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_{C} = 150 \text{mA}, I_{B} = 15 \text{mA}$			1.3	V
		$I_{\rm C} = 500 \text{mA}, I_{\rm B} = 50 \text{mA}$			2.6	V
Output Capacitance	Cob	$V_{CB} = 10V, I_{E} = 0$ f=1MHz			8	pF
*Current Gain Bandwidth Product	f⊤	$I_C = 50 \text{mA}, V_{CE} = 20V$ f = 100 MHz	200			MHz
Turn On Time	ton	$V_{CC} = 30V, I_{C} = 150mA$ $I_{B1} = 15mA$			45	ns
Turn Off Time	toff	$V_{CC} = 6V$, $I_C = 150mA$ $I_{B1} = I_{B2} = 15mA$			100	ns

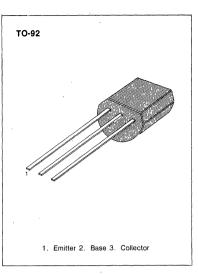
^{*} Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2% Also available as a PN2907A

• Collector-Emitter Voltage: V_{CEO} = 25V

• Collector Dissipation: Pc (max)=625mW

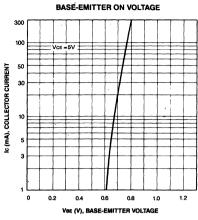
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

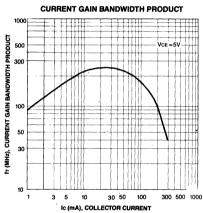
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	· V _{CBO}	40	V
Collector-Emitter Voltage	V _{CEO}	25	V
Emitter-Base Voltage	V _{EBO}	5	V
· Collector Current	l _C	600	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55∼150	°C

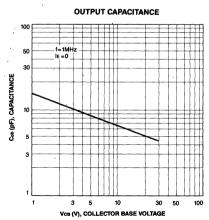


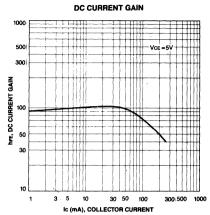
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 100 \mu A, I_{E} = 0$	40			V
*Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 10 \text{mA}, I_{B} = 0$	25			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 100 \mu A, I_C = 0$	5			
Collector Cut-off Current	Ісво	$V_{CB} = 20V, I_E = 0$			100	nA
Emitter Cut-off Current	IEBO	$V_{BE} = 3V, I_{C} = 0$			100	nA
*DC Current Gain	hee	I _C =50mA, V _{CE} =5V	60		300	
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 50 \text{mA}, I_{B} = 5 \text{mA}$			0.25	V
Output Capacitance	Cob	$V_{CB} = 10V, I_E = 0$			12	pF
•		f=1MHz				1
Current Gain Bandwidth Product	f⊤	I _C =50mA, V _{CE} =5V	100			MHz
4		f=20MHz				
* Base-Emitter On Voltage	V _{BE} (on)	$I_C = 50 \text{mA}$, $V_{CE} = 5 \text{V}$	0.6		1	V

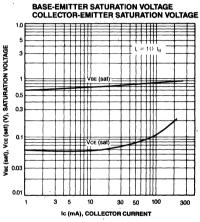
^{*} Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2%











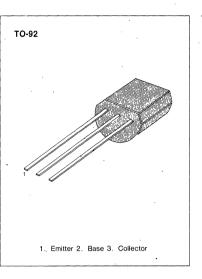
• Collector-Emitter Voltage: V_{CEO} =30V

• Collector Dissipation: Pc (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	. V
Collector-Emitter Voltage	V _{CEO}	30	V
Emitter-Base Voltage	V_{EBO}	5	V
Collector Current	Ic	600	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55 ~ 150	°C

^{*} Refer to MPS3702 for graphs



Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 100 \mu A, I_{E} = 0$	50			V
*Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =10mA, I _B =0	30			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 100 \mu A, I_C = 0$	5			V
Emitter Cut-off Current	I _{EBO}	$V_{BE} = 3V, I_{C} = 0$	1		100	nA
Collector Cut-off Current	Ісво	$V_{CB} = 20V, I_{E} = 0$	ŀ		100	nA
*DC Current Gain	h _{FE}	$I_C = 50 \text{mA}, V_{CE} = 5 \text{V}$	30	}	150	1
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 50 \text{mA}, I_{B} = 5 \text{mA}$			0.25	V
Output Capacitance	Cob	$V_{CB} = 10V, I_{E} = 0$ f=1MHz			12	pF
Current Gain Bandwidth Product	f⊤	$I_C = 50 \text{mA}, V_{CE} = 5V$ f = 20 MHz	100			MHz
*Base-Emitter On Voltage	V _{BE} (on)	$I_C = 50 \text{mA}, V_{CE} = 5 \text{V}$	0.6		1	V

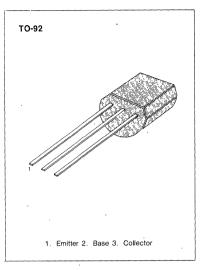
^{*} Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2%

- Collector-Emitter Voltage: V_{CEO} =30V
- Collector Dissipation: Pc (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	V
Collector-Emitter Voltage Emitter-Base Voltage	V _{CEO} V _{EBO}	30 . 5	V
Collector Current Collector Dissipation	I _C P _C	600 625	mA mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55 ~ 150	°C

[•] Refer to 2N4400 for graphs



Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{\rm C} = 100 \mu A, I_{\rm E} = 0$	50			V
*Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 10 \text{ mA}, I_{B} = 0$	30			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 100 \mu A$, $I_C = 0$	5			V
Emitter Cut-off Current	I _{EBO}	$V_{BE} = 3V, I_{C} = 0$			100	nA
Collector Cut-off Current	I _{CBO}	$V_{CB} = 20V, I_E = 0$			100	· nA
*DC Current Gain	h _{FE}	$I_{C} = 50 \text{mA}, V_{CE} = 2V$	100		300	
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 100 \text{mA}, I_{B} = 5 \text{mA}$			0.6	V
Output Capacitance	Cob	V _{CB} = 10V, I _E = 0 f=1MHz			12	pF
Current Gain Bandwidth Product	f _T	I _C =50mA, V _{CE} =2V f=20MHz	100			MHz
*Base-Emitter On Voltage	V _{BE} (on)	I _C =100mA, V _{CE} =2V	0.5		1	V

^{*} Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%

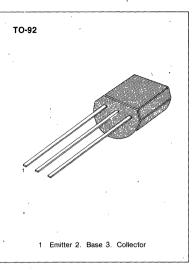
• Collector-Emitter Voltage: V_{CEO} = 30V

• Collector Dissipation: Pc (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Symbol Rating	
Collector-Base Voltage Collector-Emitter Voltage	V _{CBO}	50 30	V V
Emitter-Base Voltage Collector Current Collector Dissipation Junction Temperature Storage Temperature	V _{EBO} I _C P _C Tj Tstg	5 600 625 150 -55~150	V mA mW °C °C

[•] Refer to 2N4400 for graphs



Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{\rm C} = 100 \mu A, I_{\rm E} = 0$	50			. v
*Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 10 \text{mA}, I_{B} = 0$	30			· v
Emitter-Base Breakdown Voltage	BV _{FBO}	$I_{\rm E} = 100 \mu A$, $I_{\rm C} = 0$	5			V
Emitter Cut-off Current	I _{EBO}	V _{BF} = 3V, I _C = 0			100	nA
Collector Cut-off Current	I _{CBO}	$V_{CB} = 20V, I_{E} = 0$			100	nA
*DC Current Gain	h _{FE}	I _C =50mA, V _{CF} =2V	50		150	-
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =100mA, I _B =5mA			0.8	V
Output Capacitance	Cob	V _{CB} = 10V, I _E = 0 f=1MHz	1		12	pF
Current Gain Bandwidth Product	f _T	1 _C =50mA, V _{CE} =2V f=20MHz	100			MHz
*Base-Emitter On Voltage	V _{BE} (on)	I _C =100mA, V _{CE} =2V	0.5		1	V

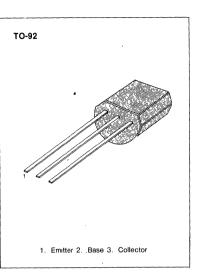
^{*} Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%

- Collector-Emitter Voltage: V_{CEO} = 20V
- Collector Dissipation: Pc (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Junction Temperature Storage Temperature	V _{CBO} V _{CEO} V _{EBO} I _C P _C T _J Tstg	40 20 5 600 625 150 -55~150	∨ ∨ ∨ mA mW °C ∘C

[•] Refer to 2N4400 for graphs



Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{\rm C} = 100 \mu A, I_{\rm E} = 0$	40			V
*Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 10 \text{mA}, I_{B} = 0$	20			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 100 \mu A$, $I_C = 0$	5			V
Emitter Cut-off Current	I _{EBO}	$V_{BE} = 3V, I_{C} = 0$			100	nA
Collector Cut-off Current	I _{CBO}	$V_{CB} = 20V, I_{E} = 0$	1		100	nA
*DC Current Gain	h _{FE}	$I_C = 50 \text{mA}, V_{CE} = 2V$	30		600	
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 100 \text{mA}, I_{B} = 5 \text{mA}$	}	(1	V
Output Capacitance	Cob	V _{CB} = 10V, I _E = 0	j		12	pF
		f=1MHz				1
Current Gain Bandwidth Product	f⊤	$I_C = 50 \text{mA}, V_{CE} = 2V$	100			MHz
		f=20MHz				
* Base-Emitter On Voltage	V _{BE} (on)	$I_{C} = 100 \text{mA}, V_{CE} = 2V$	0.5		1	V

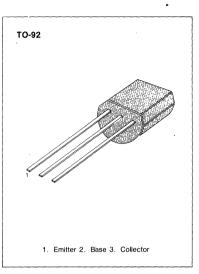
^{*} Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2%

• Collector-Emitter Voltage: V_{CEO} = 60V

• Collector Dissipation: Pc (max)=200mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Collector-Emitter Voltage Emitter-Base Voltage	V _{CBO} V _{CEO} V _{CES} V _{EBO}	60 60 60 5	>
Collector Dissipation Junction Temperature Storage Temperature	P _C T _i Tstg	200 150 –55~150	°C °C



Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 10 \mu A, I_{B} = 0$	60			V
*Collector-Emitter Sustaining Voltage	BV _{CEO} (sus)	$I_{c} = 5mA, I_{B} = 0$	60			V
Collector-Emitter Breakdown Voltage	BV _{CES}	$I_{C} = 10 \mu A, V_{BE} = 0$	60			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	5			V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 40V, I_{E} = 0$			10	nA
Emitter Cut-off Current	I _{EBO}	$V_{BE} = 3V, I_{C} = 0$			20	nA
DC Current Gain	h _{FE}	$I_C = 100 \mu A$, $V_{CE} = 5 V$	100	,	300	
		$I_C = 1 \text{mA}, V_{CE} = 5 \text{V}$	100			
,		$I_C = 10 \text{mA}, V_{CE} = 5 \text{V}$	100			}
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = 10 \text{mA}, I_B = 0.5 \text{mA}$			0.25	V
*Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_{C} = 10 \text{mA}, I_{B} = 0.5 \text{mA}$			0.9	V
Output Capacitance	Cob	$V_{CB} = 5V, I_{E} = 0$			6	pF
Noise Figure	NF	f=1MHz $I_C=20\mu A, V_{CE}=5V$	r		3	dB
-		$R_S = 10 K\Omega$, $f = 1 KHz$				
		$I_C = 250 \mu A$, $V_{CE} = 5V$ $R_S = 1K\Omega$, $f = 1KHz$			3	dB

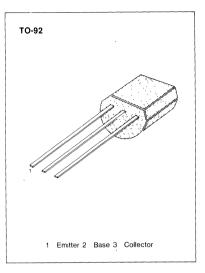
^{*} Pulse Test: Pulse Width \leq 300 μ s, Duty Cycle \leq 2%

• Collector-Emitter Voltage: V_{CEO} = 40V

• Collector Dissipation: Pc (max)=200mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Dissipation Junction Temperature Storage Temperature	V _{CBO} V _{CEO} V _{CES} V _{EBO} P _C T _j Tstg	40 40 40 5 150 -55~150	V V V mw °C °C



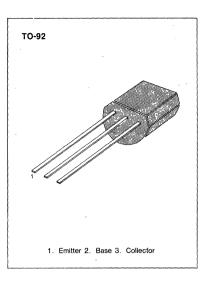
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{\rm C} = 10 \mu A, I_{\rm E} = 0$	40			V
*Collector-Emitter Sustaining Voltage	BV _{CEO} (Sus)	$I_{C} = 5mA, I_{B} = 0$	40	}		V
Collector-Emitter Breakdown Voltage	BV _{CES}	$I_C = 5mA$, $V_{BE} = 0$	40			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	5			V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 50V, I_E = 0$		-	10	nΑ
Emitter Cut-off Current	I _{EBO}	$V_{BE} = 3V, I_{C} = 0$			20	nA
DC Current Gain	h _{FE}	$I_C = 100 \mu A$, $V_{CE} = 5 V$	250		700	
		$I_C = 1 \text{mA}, V_{CE} = 5 \text{V}$	250			
		$I_C = 10 \text{mA}, V_{CE} = 5 \text{V}$	250			
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = 10 \text{mA}, I_B = 0.5 \text{mA}$			0.25	V
*Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_{\rm C} = 10 \rm mA$, $I_{\rm B} = 0.5 \rm mA$]	0.9	V
Output Capacitance	Cob	$V_{CB} = 5V, I_E = 0$ f=1MHz			6	pF
Noise Figure	NF	$I_C = 20\mu A$, $V_{CE} = 5V$ $R_S = 10K\Omega$, $f = 1KHz$			2	dB
		$I_C = 250 \mu A$, $V_{CE} = 5V$ $R_S = 1K\Omega$, $f = 1KHz$			2	dB

^{*} Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2%

- Collector-Emitter Voltage: V_{CEO} = 60V
- Collector Dissipation: Pc (max)=200mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	60	V
Collector-Emitter Voltage	V _{CEO} .	60	V
Collector-Emitter Voltage	V _{CES}	60	V
Emitter-Base Voltage	V_{EBO}	5	V
Collector Dissipation	P_{C}		mW
Junction Temperature	T _i	150	°C
Storage Temperature	Tstg	-55∼150	°C



Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 10 \mu A, I_{E} = 0$	60			٧
*Collector-Emitter Sustaining Voltage	BV _{CEO} (SUS)	$I_C = 5mA$, $I_B = 0$	60			. V
Collector-Emitter Breakdown Voltage	BV _{CES}	$I_C = 5mA$, $V_{BE} = 0$	60			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	5	,		V.
Collector Cut-off Current	I _{CBO}	$V_{CB} = 40V, I_{E} = 0$	-		10	nA
Emitter Cut-off Current	I _{EBO}	$V_{BE} = 3V, I_{C} = 0$			20	nA
DC Current Gain	h _{FE}	$I_C = 100 \mu A$, $V_{CE} = 5V$	250		700	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 10 \text{mA}, I_{B} = 0.5 \text{mA}$,	0.25	V
*Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_{C} = 10 \text{mA}, I_{B} = 0.5 \text{mA}$			0.9	V
Output Capacitance	Cob	V _{CB} =5V, I _E =0 f=1MHz			6	pF
Noise Figure	NF	$I_C = 20\mu A$, $V_{CE} = 5V$ $R_S = 10K\Omega$, $f = 1KHz$			2	dB
•		$I_C = 250 \mu A$, $V_{CE} = 5V$ $R_S = 1K\Omega$, $f = 1KHz$			2	dB

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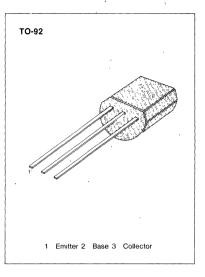
AMPLIFIER TRANSISTOR

Collector-Emitter Voltage: V_{CEO} = 25V
 Collector Dissipation: P_C (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Junction Temperature Storage Temperature	V _{CBO} V _{CEO} V _{EBO} I _C P _C T _{.j} Tstq	25 25 5 100 625 150 –55~150	V V MA mW °C

[•] Refer to MPSA10 for graphs



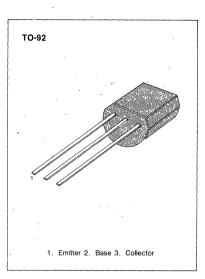
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =10mA, I _B =0	25			٧
Collector Cut-off Current	I _{CBO}	$V_{CB} = 25V, I_{E} = 0$			100	nΑ
Collector Cut-off Current	ICES	$V_{CE} = 25V, V_{BE} = 0$			100	nΑ
Emitter Cut-off Current	I _{EBO}	$V_{BE} = 5V, I_{C} = 0$			100	nΑ
*DC Current Gain	h _{FE}	$I_{C} = 10 \text{mA}, V_{CE} = 10 \text{V}$	100		500	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1mA			0.25	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_C = 10 \text{mA}$, $I_B = 1 \text{mA}$		0.75		V
Current Gain Bandwidth Product	f _T	$I_C = 2mA$, $V_{CE} = 5V$		120		MHz
Base Emitter On Voltage	V _{BE} (on)	$I_C = 10 \text{mA}, V_{CE} = 10 \text{V}$	0.5		1.2	٧

^{*} Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%

HIGH FREQUENCY TRANSISTOR

ABSCLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	20	v
Collector-Emitter Voltage	V _{CEO}	12	V
Emitter-Base Voltage	V _{EBO} .	2.5	V
Collector Current	l _c	50	mA
Collector Dissipation (T _a =25°C)	Pc	200	mW
Derate above 25°C		1.14	mW/°C
Collector Dissipation (T _c =25°C)	Pc	300	mW
Derate above 25°C		1.71	mW/°C
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55~150	°C



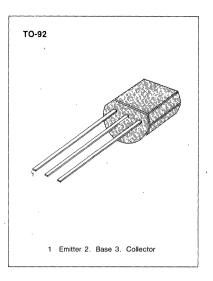
Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector Emitter Sustaining Voltage	V _{CEO} (sus)	$I_C=3mA$, $I_B=0$	12		V
Collector Base Breakdown Voltage	BV _{CBO}	$I_{C}=0.001$ mA, $I_{E}=0$	20		V
Emitter Base Breakdown Voltage	BV _{EBO}	$I_E=0.01$ mA, $I_C=0$	2.5		V
Collector Cutoff Current	I _{CBO}	$V_{CB} = 15V, I_E = 0$		0.02	μΑ
		$V_{CB}=15V, I_{E}=0, T_{a}=150^{\circ}C$. 1	μΑ
DC Current Gain	h _{FE}	$V_{CE}=1V$, $I_{C}=3mA$	25	250	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C=10mA$, $I_B=1mA$		0.4	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =10mA, I _B =1mA		1	V
Current Gain Bandwidth Product	f _T	$V_{CE}=6V$, $I_{C}=5mA$, $f=100MHz$	900	2000	MHz
Collector Base Capacitance	Ccb	$V_{CB}=10V$, $I_{E}=0$, $f=0.1$ to 1MHz		1	pF
Small Signal Current Gain	hfe .	$V_{CE}=6V$, $I_{C}=2mA$, $f=1KHz$	25	300	
Collector Base Time Constant	Cc+rbb	$V_{CB}=6V, I_{E}=2mA, f=31.9MHz$	3	14	ps
Noise Figure	NF	V_{CE} =6V, I_{C} =1.5mA, f=200MHz Rs=50 Ω		4.5	dB
Common Emitter Amplifier Power Gain	Gpe	V _{CE} =6V, I _C =5mA, f=200MHz	՝ 15		dB

Collector-Emitter Voltage: V_{CEO} = 30V
 Collector Dissipation: P_C (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Emitter Voltage	V _{CEO}	30	V
Collector-Base Voltage	V _{CBO}	40	V
Emitter-Base Voltage	V_{EBO}	4	V
Collector Current	lc	100	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55 ~ 150	°C

[•] Refer to 2N3904 for graphs



Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 500 \mu A, I_{B} = 0$	30			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A$, $I_C = 0$	4			V
Collector Cut-off Current	Ісво	$V_{CB} = 30V, I_{E} = 0$			50	nA
DC Current Gain	h _{EE}	$I_{C} = 2mA, V_{CE} = 10V$	90		180	1
		$^*I_C = 100 \text{mA}, V_{CE} = 10 \text{V}$	60			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =50mA, I _B =5mA			0.5	V
Output Capacitance	Cob	$V_{CB} = 10V$, $I_E = 0$ f = 100KHz			3.5	pF

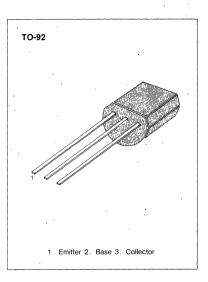
^{*}Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2%

- Collector-Emitter Voltage: V_{CEO} = 40V
- Collector Dissipation: Pc (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Emitter Voltage	V _{CEO}	40	٧
Collector-Base Voltage	V _{CBO}	40	V
Emitter-Base Voltage	V _{EBO}	4	V
Collector Current	Ic	100	mA
Collector Dissipation	P _C	625	mW
Junction Temperature	Τj	150	°C
Storage Temperature	Tstg	-55~150 ·	°C

[•] Refer to 2N3906 for graphs



Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 500 \mu A, I_{B} = 0$	40			. V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A$, $I_C = 0$	4			. V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 30V, I_E = 0$			50	nΑ
DC Current Gain	h _{FE}	$I_C = 2mA$, $V_{CE} = 10V$	90		180	
		$*I_{C} = 100 \text{ mA}, V_{CE} = 10 \text{ V}$	60	· .		
Collector-Emitter Saturation voltage	V _{CE} (sat)	$I_C = 50 \text{mA}$, $I_B = 5 \text{mA}$			0.5	V
Output Capacitance	Cob	$V_{CB} = 10V, I_{E} = 0$ f=100KHz			3.5	pF

^{*}Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2%

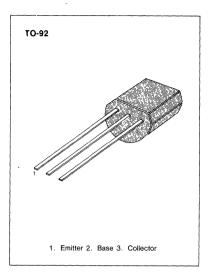
• Collector-Emitter Voltage: V_{CEO} = 25V

• Collector Dissipation: Pc (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage	V _{CBO}	40 25	V V
Emitter-Base Voltage Collector Current	V _{EBO}	4 100	mA
Collector Dissipation Junction Temperature	P _C T _J	625 150	°C
Storage Temperature	Tstg	-55∼150	°C

^{*} Refer to 2N3904 for graphs



Symbol	Test Conditions	Min	Тур	Max	Unit
BV _{CEO}	I _C =0.5mA, I _B =0	25			V
BV _{EBO}	$I_E = 10 \mu A$, $I_C = 0$	4			V
I _{CBO}	$V_{CB} = 30V, I_E = 0$			50	nA
	$V_{CB} = 20V, I_{E} = 0$			50	nΑ
h _{FE}	$I_C = 100 \mu A$, $V_{CE} = 10V$	100			
	$I_C = 2mA$, $V_{CE} = 10V$	200		400	1
V _{CE} (sat)	$I_C = 50 \text{mA}, I_B = 5 \text{mA}$			0.5	V
Cob	V _{CB} = 10V, I _E = 0 f=100KHz			3.5	pF
NF .	$I_C = 10 \mu A$, $V_{CE} = 5V$ $R_S = 10 K\Omega$			3	dB
	BV _{CEO} BV _{EBO} I _{CBO} I _{CBO} h _{FE} V _{CE} (sat) Cob	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$

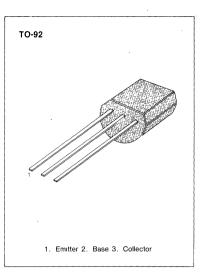
Collector-Emitter Voltage: V_{CEO} = 25V

• Collector Dissipation: Pc (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	40	٧
Collector-Emitter Voltage	V _{CEO}	25	V
Emitter-Base Voltage	V _{EBO}	4	V
Collector Current	l _C	100	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	T,i	150	°C
Storage Temperature	Tstg	-55 ~ 150	°C

^{*} Refer to 2N3904 for graphs



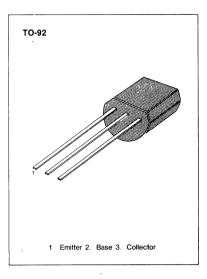
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CFO}	$I_{C} = 0.5 \text{mA}, I_{B} = 0$	25			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A$, $I_C = 0$	4			V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 30V, I_E = 0$			50	nA
	333	$V_{CB} = 20V, I_E = 0$	1		50	nA
DC Current Gain	hee	$I_{\rm C} = 100 \mu A$, $V_{\rm CE} = 10 V$	150			
		$I_{C} = 2mA, V_{CE} = 10V$.300		600	
Collector-Emitter Saturation Voltage	V _{CF} (sat)	I _C =50mA, I _B =5mA	1		0.5	V
Output Capacitance	Cob	$V_{CB} = 10V, I_{E} = 0$ f=100KHz			3.5	pF
Noise Figure	NF	$I_{C} = 10 \mu A, V_{CE} = 5V$ $R_{S} = 10 K\Omega$			3	dB
		f=10Hz to 10KHz			1	

- Collector-Emitter Voltage: V_{CEO} = 25V
- Collector Dissipation: Pc (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	25	V
Collector-Emitter Voltage	V _{CEO}	25	V
Emitter-Base Voltage	V _{EBO}	4	V
Collector Current	Ic	100	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55 ~ 150	°C

^{*} Refer to 2N3906 for graphs



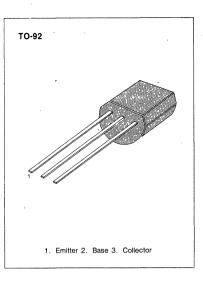
Symbol	Test Conditions	Min	Тур	Max	Unit
BV _{CEO}	I _C = 0.5mA, I _B = 0	25			v
BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	4			V
I _{CBO}	$V_{CB} = 30V, I_{E} = 0$			50	nA
h _{FE}	$V_{CB} = 20V, I_{E} = 0$ $I_{C} = 100 \mu A, V_{CE} = 10V$	100		50	nA
	I _C = 2mA, V _{CE} = 10V	200		400	
V _{CF} (sat)	I _C =50mA, I _B =5mA			0.5	v
Cob	$V_{CB} = 10V, I_E = 0, f = 100KHz$			3.5	pF
NF	$I_{C} = 10 \mu A$, $V_{CE} = 5V$ $R_{S} = 10 K \Omega$			3	dB
	BV _{CEO} BV _{EBO} I _{CBO} I _{CBO} h _{FE} V _{CE} (sat) Cob	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$

Collector-Emitter Voltage: V_{CEO} = 25V
 Collector Dissipation: P_c (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	25	٧
Collector-Emitter Voltage	V _{CEO}	25	V
Emitter-Base Voltage	V _{EBO}	4	V
Collector Current	Ic	100	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55 ~ 150	°C

[•] Refer to 2N3906 for graphs



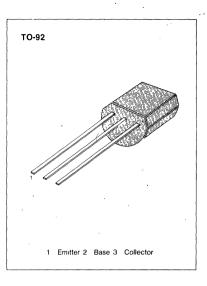
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =0.5mA, I _B =0	25			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	4			V
Collector Cut-off Current	I _{CBO}	V _{CB} =30V, I _E =0			50	nA
		V _{CB} = 20V, I _E = 0			50	nA
DC Current Gain	h _{FE}	$I_C = 100 \mu A$, $V_{CE} = 10 V$	150			
		$I_C = 2mA$, $V_{CE} = 10V$	300		<i>∞</i> 600	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = 50 \text{mA}$, $I_B = 5 \text{mA}$			0.5	V
Output Capacitance	Cob	$V_{CB} = 10V, I_{E} = 0$ f=100KHz			3.5	pF
Noise Figure	NF	$I_C = 10\mu A$, $V_{CE} = 5V$ $R_S = 10K\Omega$ f = 10Hz to 10KHz		,	3	dB

AUDIO TRANSISTOR

- Collector-Emitter Voltage: V_{CEO} =25V
- Collector Dissipation: Pc (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Ųnit
Collector-Base Voltage	V _{CBO}	25	V
Collector-Emitter Voltage	V _{CEO}	25	V
Emitter-Base Voltage	V _{EBO}	5 ·	V
Collector Current	l _C	500	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	T _{.j}	150	°C
Storage Temperature	Tstg	-55~150	°C



Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
*Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =10mA, I _B =0	25			V
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{\rm C} = 100 \mu A$, $I_{\rm E} = 0$	25		}	V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_{\rm E} = 100 \mu A$, $I_{\rm C} = 0$	5		}	V
Collector Cut-off Current	ICEO	V _{CF} = 25V, I _B = 0			100	nA
Collector Cut-off Current	Iceo	V _{CB} = 20V, I _E = 0			100	nA
Emitter Cut-off Current	I _{EBO}	V _{EB} = 4V, I _C = 0			100	nA
*DC Durrent Gain	hee	Ic = 10mA, Vc= = 1V	35			
		$I_{C} = 100 \text{mA}, V_{CF} = 1 \text{V}$	50			1
,		$I_{C} = 500 \text{mA}, V_{CF} = 1 \text{V}$	50		200	
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =500mA, I _B =50mA			0.5	V
Current Gain Bandwidth Product	f⊤	I _C =10mA, V _{CE} =10V f=30MHz	60			MHz
*Base-Emitter On Voltage	V _{BE} (on)	I _C = 500mA, V _{CE} = 1V			1.2.	V
Output Capacitance	Çob	V _{CB} =10V, I _E =0 f=100KHz			30	pF

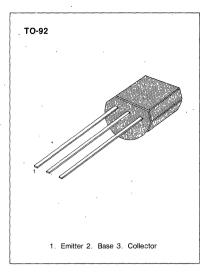
^{*} Pulse Test: Pulse Width ≤300 µs, Duty Cycle ≤2%

AUDIO TRANSISTOR

- Collector-Emitter Voltage: V_{CEO}=25V
 Collector Dissipation: P_C (max)=625mW
- Complement to MPS6560

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Symbol	Rating	Unit
V _{CBO}	25	V
V _{CEO}	25	V
V_{EBO}	5	V
Ic	500	mA
Pc	625	mW
Tj	150	· °C
Tstg	−55 ~ 150	°C
	VCBO VCEO VEBO IC PC TJ	V _{CBO} 25 V _{CEO} 25 V _{EBO} 5 I _C 500 P _C 625 T _J 150



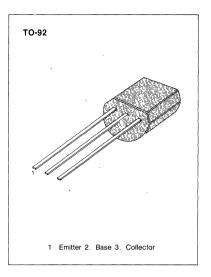
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
*Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =10mA, I _B =0	25			V
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{\rm C} = 100 \mu A, I_{\rm E} = 0$	25		,	V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 100 \mu A$, $I_C = 0$	5			V
Collector Cut-off Current	I _{CEO}	$V_{CE} = 25V, I_B = 0$			100	nA
Collector Cut-off Current	Ісво	$V_{CB} = 20V, I_E = 0$, ,	100	nA
Emitter Cut-off Current	I _{EBO}	$V_{EB} = 4V, I_{C} = 0$			100	nΆ
*DC Durrent Gain	h _{FE}	$I_C = 10 \text{mA}$, $V_{CE} = 1 \text{V}$	35			
		$I_{C} = 100 \text{ mA}, V_{CE} = 1 \text{ V}$	50		1	
•		$I_{c} = 500 \text{mA}, V_{ce} = 1 \text{V}$	50		200	
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =500mA, I _B =50mA			0.5	V
Current Gain Bandwidth Product	f⊤	I _C = 10mA, V _{CE} = 10V f=30MHz	60			MHz
*Base-Emitter On Voltage	V _{BE} (on)	I _C =500mA, V _{CE} =1V			1.2	V
Output Capacitance	Cob	$V_{CB} = 10V, I_{E} = 0$ f=100KHz		-	30	pF

^{*} Pulse Test: Width ≤300 μs, Duty Cycle ≤2%

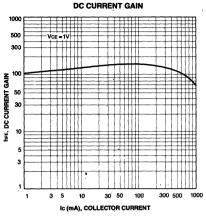
Collector-Emitter Voltage: V_{CEO} = 25V
 Collector Dissipation: P_C (max)=625mW

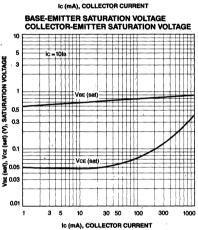
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

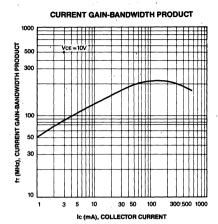
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	25	V
Collector-Emitter Voltage	V _{CEO}	25	V
Emitter-Base Voltage	V _{EBO}	4	V
Collector Current	Ic	1000	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55∼150	°C

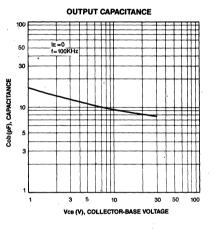


Characteristic .	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 1 \text{mA}, I_{B} = 0$	25			V
Collector-Base Breakdown Voltage	BV _{CBO}	$I_C = 100 \mu A, I_E = 0$	25			V
Emitter Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	4			V
Collector Cut-off Current	I _{CEO}	$V_{CE} = 25V, I_B = 0$			100	nA
Collector Cut-off Current	I _{CBO}	$V_{CB} = 25V, I_E = 0$			100	nA
DC Current Gain	h _{FE}	$I_{C} = 100 \text{mA}, V_{CE} = 1 \text{V}$	50			
		$I_{C} = 500 \text{mA}, V_{CE} = 1 \text{V}$	50			j
		$I_{C} = 1000 \text{mA}, V_{CE} = 1 \text{V}$	30			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 1000 \text{mA}$, $I_{B} = 100 \text{mA}$			0.6	V
Current Gain Bandwidth Product	f _T	$I_{\rm C} = 50 \text{mA}, V_{\rm CE} = 10 \text{V}$	100			MHz
,		f=30MHz				
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=100KHz			30	pF







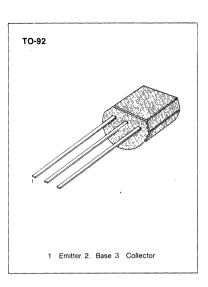


Collector-Emitter Voltage: V_{CEO} = 40V
 Collector Dissipation: P_C (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	30	٧
Collector-Emitter Voltage	V _{CEO}	40	V
Emitter-Base Voltage	V _{EBO}	4	V
Collector Current	Ic	1000	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	TJ	150	°C
Storage Temperature	Tstg	-55~150	°C

[•] Refer to MPS6601 for graphs



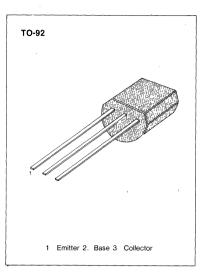
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =1mA, I _B =0	40			V
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 100 \mu A, I_{E} = 0$	40			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	4			V
Collector Cut-off Current	ICEO	$V_{CE} = 30V, I_{B} = 0$			100	nA
Collector Cut-off Current	I _{CBO}	$V_{CB} = 30V, I_E = 0$			100	nA
DC Durrent Gain	h _{FE}	$I_{C} = 100 \text{mA}, V_{CE} = 1 \text{V}$	50			i
		$I_{C} = 500 \text{mA}, V_{CE} = 1 \text{V}$	50	,		
		$I_{C} = 1000 \text{mA}, V_{CE} = 1 \text{V}$	30	,		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = 1000 \text{mA}, I_B = 100 \text{mA}$			0.6	V
Current Gain Bandwidth Product	f _T	$I_{C} = 50 \text{mA}, V_{CE} = 10V$ f=30MHz	100			MHz
Output Capacitance	Cob	$V_{CB} = 10V, I_E = 0$ f=100KHz			30	pF

• Collector-Emitter Voltage: V_{CEO} = 25V

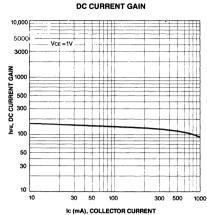
• Collector Dissipation: Pc (max)=625mW

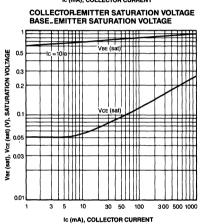
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

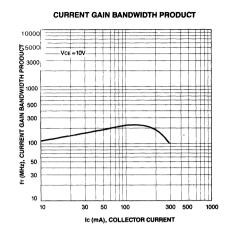
Characteristic	Symbol	Rating	Unit
Collector-Emitter Voltage	V _{CEO}	25	V
Collector-Base Voltage	V _{CBO}	25	V
Emitter-Base Voltage	V_{EBO}	4	V
Collector Current	Ic	1	A
Collector Dissipation	P _C	625	mW
Junction Temperature	T.j	150	°C
Storage Temperature	Tstg	−55 ~ 150	°C

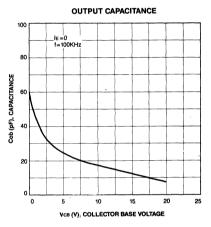


Symbol	Test Conditions	Min	Тур	Max	Unit
BV _{CEO}	I _C =1mA, I _B =0	25			V
BV _{CBO}	$I_{C} = 100 \mu A, I_{E} = 0$	25		1	V
BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	4			V
I _{CBO}				ļ	1
	V _{CB} = 25V, I _E = 0			100	nA
I _{CEO}	,		,	}	1
	$V_{CE} = 25V, I_{B} = 0$			100	nA
h _{FE}	$I_{C} = 100 \text{mA}, V_{CE} = 1 \text{V}$	50			
	$I_{C} = 500 \text{mA}, V_{CF} = 1 \text{V}$	50			
	I _C =1A, V _{CE} =1V	30	1		
V _{CE} (sat)	$I_C = 1A$, $I_B = 100mA$			0.6	V
Cob	$V_{CB} = 10V, I_{E} = 0$			30	pF
	f=100KHz				1
V _{BE} (on)	$I_{C} = 500 \text{mA}, V_{CE} = 1 \text{V}$			1.2	V
f _T	$I_{C} = 50 \text{mA}, V_{CE} = 10 \text{V}$	100			MHz
1 ''	f=30MHz				
ton	V _{CC} =40V, I _C =500mA			55	ns
	1				
toff	V _{CC} = 40V, I _C = 500mA	1		300	ns
	BV _{CEO} BV _{CBO} BV _{EBO} I _{CBO} I _{CEO} h _{FE} V _{CE} (sat) Cob V _{BE} (on) f _T ton	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$









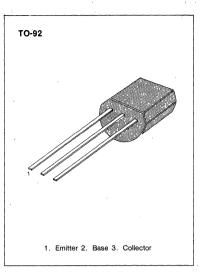
• Collector-Emitter Voltage: V_{CEO} =40V

• Collector Dissipation: Pc (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Junction Temperature Storage Temperature	Vсво Vсво Vвво Ic Pc Tj	60 40 6 200 625 150 -55~150	V V V mA mW °C

^{*} Refer to 2N5088 for graphs



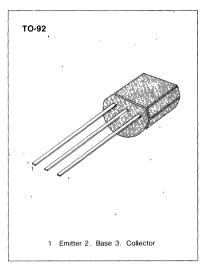
Symbol	Test Conditions	Min	Тур	` Max	Unit
BV _{CEO}	I _C =10mA, I _B =0	40	. '		V
Ісво	$V_{CB} = 40V, I_{E} = 0$			30	nA
	$V_{CB} = 60V, I_E = 0$	1		10	nA
I _{EBO}	$V_{BE} = 6V, I_{C} = 0$			20	nA
h _{FE}	$I_{\rm C} = 100 \mu A$, $V_{\rm CE} = 5 V$	250		700	
Cob	V _{CB} =5V, I _E =0 f=1MHz	1		4	pF
V _{BE} (on)	$I_{C} = 100 \mu A, V_{CE} = 5V$	0.45		0.65	V
NF	$I_C = 100 \mu A$, $V_{CE} = 5V$ $R_S = 10 K\Omega$, $f = 10 Hz$			2	dB
	BVcEO IcBO IEBO hFE COb	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$

^{*} Pulse Test: Pulse Width ≤ 300µs, Duty Cycle ≤ 2%

- Collector-Emitter Voltage: V_{CEO} = 60V
- Collector Dissipation: Pc (max)=625mW

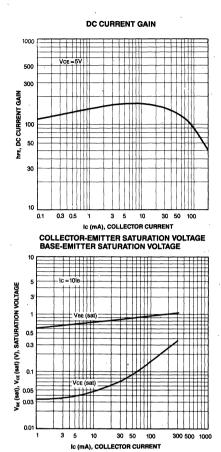
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

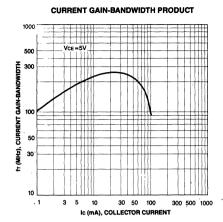
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	60	V
Collector-Emitter Voltage	V _{CEO}	60	V
Emitter-Base Voltage	V _{EBO}	6	V
Collector Current	Ic	500	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	Ti	150	°C
Storage Temperature	Tstg	−55 ~ 150	۰c

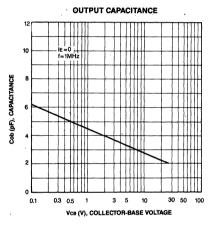


Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 100 \mu A, I_{E} = 0$	60			V
*Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = 10 \text{mA}, I_{B} = 0$	60			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	6			V
Collector Cut-off Current	ICEO	$V_{CE} = 60V, I_B = 0$			100	nA
Collector Cut-off Current	I _{CBO}	$V_{CB} = 60V, I_{E} = 0$			100	nA
Emitter Cut-off Current	I _{EBO}	$V_{EB} = 6V, I_{C} = 0$			100	nA
*DC Current Gain	h _{FE}	$I_C = 1 \text{mA}, V_{CE} = 5 \text{V}$	100		300	
		$I_C = 10 \text{mA}, V_{CE} = 5 \text{V}$	100			
		$I_{C} = 100 \text{mA}, V_{CE} = 5 \text{V}$	75		}	
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 100 \text{mA}, I_{B} = 5 \text{mA}$			0.4	V
	(,, ,	$I_{C} = 100 \text{mA}, I_{B} = 10 \text{mA}$			0.3	V
Output Capacitance	Cob	V _{CB} = 5V, I _E = 0			6	pF
	'	f=1MHz				
Current Gain Bandwidth Product	f _T	I _C =10mA, V _{CE} =5V	150			MHz
		f=100MHz				
*Base-Emitter On Voltage	V _{BE} (on)	$I_C = 1mA$, $V_{CE} = 5V$	0.5		0.7	V

^{*} Pulse Test: Pulse Width≤300µs, Duty Cycle≤2%







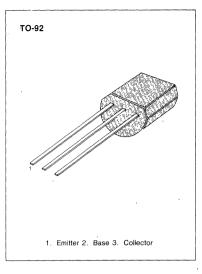
• Collector-Emitter Voltage: V_{CEO} = 80V

• Collector Dissipation: Pc (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta =25°C)

Characteristic	Symbol Rat		Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage	V _{CBO} V _{CEO} V _{EBO}	80 80 6	V V
Collector Current Collector Dissipation	I _C	500 625	mA mW
Junction Temperature Storage Temperature	Tj Tstg	150 -55~150	•°C

[•] Refer to MPS8098 for graphs



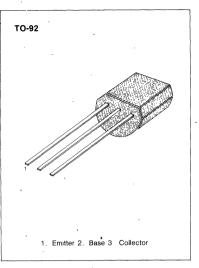
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
*Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =10mA, I _B =0	80			V
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 100 \mu A, I_{E} = 0$	80			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A$, $I_C = 0$	6			V
Collector Cut-off Current	ICEO	$V_{CE} = 60V, I_B = 0$			100	nA
Collector Cut-off Current	Ісво	$V_{CB} = 80V, I_{E} = 0$			100	nA
Emitter Cut-off Current	I _{EBO}	$V_{BE} = 6V, I_{C} = 0$			100	nA
* DC Current Gain	h _{FE}	$I_C = 1 \text{mA}, V_{CE} = 5 \text{V}$	100		300	
		$I_C = 10 \text{mA}, V_{CE} = 5 \text{V}$	100			
1		$I_C = 100 \text{mA}, V_{CE} = 5 \text{V}$	75			
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = 100 \text{mA}, I_B = 5 \text{mA}$			0.4	V
		$I_{C} = 100 \text{mA}, I_{B} = 10 \text{mA}$			0.3	V
*Base-Emitter On Voltage	V _{BE} (on)	$I_C = 10 \text{mA}, V_{CE} = 5 \text{V}$	0.6		0.8	V
Current Gain Bandwidth Product	f _T	$I_C = 10$ mA, $V_{CE} = 5$ V f = 100MHz	150			MHz
Output Capacitance	Cob	$V_{CB}=5V$, $I_E=0$ f=1MHz			6	pF

^{*} Pulse Test: Pulse Width≤300µs, Duty Cycle≤2%

- Collector-Emitter Voltage: V_{CEO} = 60V
- Collector Dissipation: Pc (max)=625mW

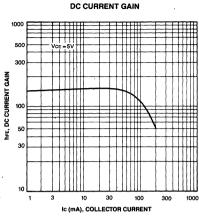
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

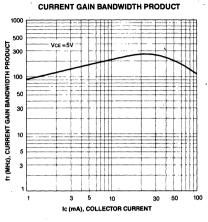
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	60	·V
Collector-Emitter Voltage	. V _{CEO}	60	V
Emitter-Base Voltage	V _{EBO}	5	.V
Collector Current	lc	500	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	Τj	150	°C
Storage Temperature	Tstg	-55 ~ 150	°C

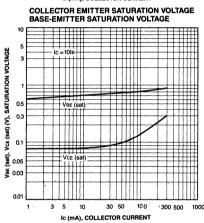


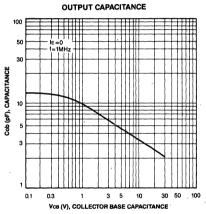
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
*Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =10mA, I _B =0	60			v
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 100 \mu A, I_{E} = 0$	60			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	5			V
Collector Cut-off Current	ICEO	$V_{CE} = 60V, I_B = 0$,		100	nA
Collector Cut-off Current	I _{CBO}	$V_{CB} = 60V, I_E = 0$			100	nA
Emitter Cut-off Current	I _{EBO}	$V_{BE} = 4V, I_{C} = 0$			100	nA
* DC Current Gain	h _{FE}	$I_C = 1 \text{mA}$, $V_{CE} = 5 \text{V}$	100		300	
η		$I_{C} = 10 \text{mA}, V_{CE} = 5 \text{V}$	100			
• ($I_{C} = 100 \text{mA}, V_{CE} = 5 \text{V}$	75			
* Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 100 \text{mA}, I_{B} = 5 \text{mA}$			0.4	V
<u> </u>		$I_{C} = 100 \text{mA}, I_{B} = 10 \text{mA}$			0.3	V
*Base-Emitter On Voltage	V _{BE} (on)	$I_C = 1$ mA, $V_{CE} = 5V$	0.5		0.7	V
Current Gain Bandwidth Product	f _T	$I_{C} = 10 \text{mA}, V_{CE} = 5 \text{V}$	150			MHz
		f=100MHz				
Output Capacitance	Cob	V _{CB} = 5V, I _E = 0	,		8	pF
		f=1MHz				1

^{*} Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2%









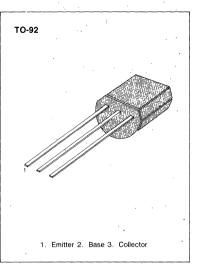
• Collector-Emitter Voltage: V_{CEO} =80V

• Collector Dissipation: Pc (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	· V _{CBO}	80	V
Collector-Emitter Voltage	V _{CEO}	80	V
Emitter-Base Voltage	V _{EBO}	5	V
Collector Current	l _C	500	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	T.j	150	•C
Storage Temperature	Tstg	-55∼150	•c

[•] Refer to MPS8598 for graphs



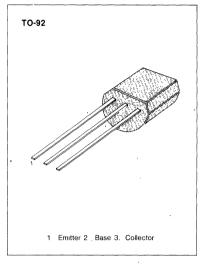
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
*Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =10mA, I _B =0	80			v
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{\rm C} = 100 \mu A$, $I_{\rm E} = 0$	80		1	V .
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_{\rm E} = 10 \mu A$, $I_{\rm C} = 0$	5			V
Collector Cut-off Current	ICEO	$V_{CE} = 60V, I_B = 0$			100	nA
Collector Cut-off Current	Ісво	$V_{CB} = 80V, I_{E} = 0$			100	nA
Emitter Cut-off Current	I _{EBO}	$V_{BE} = 4V, I_{C} = 0$			100	nA
*DC Current Gain	h _{FE}	$I_C = 1mA$, $V_{CE} = 5V$	100		300	
,		$I_C = 10 \text{mA}, V_{CE} = 5 \text{V}$	100	٠.,		
		$I_{C} = 100 \text{mA}, V_{CE} = 5 \text{V}$	75		,	1
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 100 \text{mA}, I_{B} = 5 \text{mA}$,	0.4	V
		$I_{C} = 100 \text{mA}, I_{B} = 10 \text{mA}$			0.3	V
*Base-Emitter On Voltage	V _{BE} (on)	$I_{C} = 10 \text{mA}, V_{CE} = 5 \text{V}$	0.6		0.8	V
Current Gain Bandwidth Product	f _T	$I_C = 10 \text{mA}, V_{CE} = 5 \text{V}$ f=100MHz	150			MHz
Output Capacitance	Cob	$V_{CB} = 5V$, $I_E = 0$ f = 1MHz			8	pF

^{*} Pulse Test: Pulse Width≤300µs, Duty Cycle≤2%

Collector-Emitter Voltage: V_{CEO} = 60V
 Collector Dissipation: P_C (max)=625mW

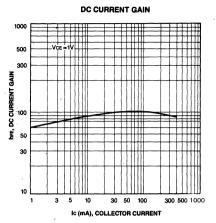
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

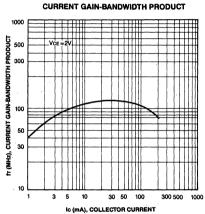
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	60	V
Collector-Emitter Voltage	V _{CEO}	60	V
Emitter-Base Voltage	V _{EBO}	. 4 .	V
Collector Current	Ic	500	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	Ti	150	•C
Storage Temperature	Tstg	-55∼150	°C

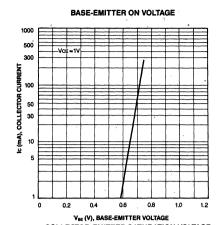


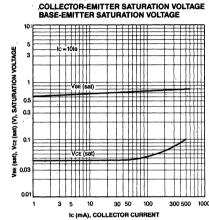
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
*Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =1mA, I _B =0	. 60			v
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 100 \mu A, I_C = 0$	4			V
Collector Cut-off Current	I _{CEO}	$V_{CE} = 60V, I_B = 0$			100	nA
Collector Cut-off Current	ICBO	$V_{CB} = 60V, I_E = 0$	İ		100	nA
DC Current Gain	h _{EE}	I _C =10mA, V _{CE} =1V	50			
	'-	Ic = 100mA, V _{CE} = 1V	50			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =100mA, I _B =10mA			0.25	V
Current Gain Bandwidth Product	f _T	$I_C = 10 \text{mA}, V_{CE} = 2V$	100			MHz
•		f=100MHz	,			
Base-Emitter On Voltage	V _{BE} (on)	$I_C = 100 \text{mA}, V_{CE} = 1 \text{V}$			1.2	V

^{*} Pulse Test: Pulse Width ≤ 300 µS, Duty Cycle ≤ 2%









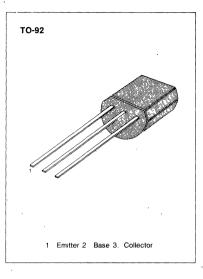
• Collector-Emitter Voltage: V_{CEO} =80V

• Collector Dissipation: Pc (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	80	V
Collector-Emitter Voltage	V _{CEO}	80	V
Emitter-Base Voltage	V _{EBO}	4	V
Collector Current	Ic	500	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55~150	°C

[•] Refer to MPSA05 for graphs



Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
* Collector-emitter Breakdown Voltage	BV _{CEO}	I _C =1mA, I _B =0	80			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 100 \mu A, I_C = 0$	4			V
Collector Cut-off Current	I _{CEO}	$V_{CE} = 60V, I_B = 0$	j		100	nΆ
Collector Cut-off Current	I _{CBO}	$V_{CB} = 80V, I_E = 0$			100	nA
DC Current Gain	h _{FE}	$I_C = 10 \text{mA}, V_{CE} = 1 \text{V}$	50			
		$I_{C} = 100 \text{mA}, V_{CE} = 1 \text{V}$	50	-		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 100 \text{mA}, I_{B} = 10 \text{mA}$			0.25	V
Current Gain Bandwidth Product	f _T	I _C =10mA, V _{CE} =2V f=100MHz	100			MHz
Base-Emitter On Voltage	V _{BE} (on)	$I_C = 100 \text{mA}, V_{CE} = 1 \text{V}$			1.2	٧

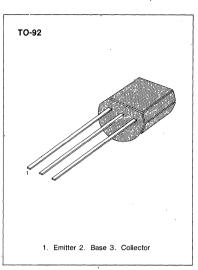
^{*} Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2%

• Collector-Emitter Voltage: V_{CEO} = 40V

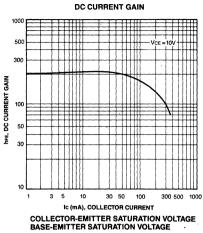
• Collector Dissipation: Pc (max)=625mW

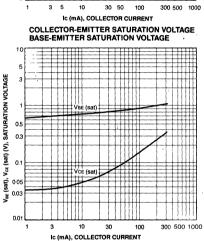
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

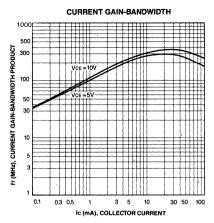
Symbol	Rating	Unit
V _{CEO}	40	V
· V _{EBO}	4	V
lc	100	mA
Pc	625	mW
TJ	150	°C
Tstg	−55∼150	°C
	V _{CEO} V _{EBO} I _C P _C T _J	V _{CEO} 40 V _{EBO} 4 I _C 100 P _C 625 T _J 150

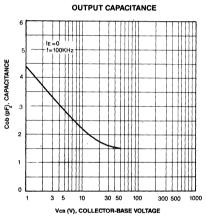


Characteristic * `	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =1mA, I _B =0	40			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 100 \mu A, I_C = 0$	4			V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 30V, I_{E} = 0$			100	nA
DC Current Gain	h _{FF}	$I_{C} = 5 \text{mA}, V_{CE} = 10 \text{V}$	40		400	
Current Gain Bandwidth Product	fT	I _C =5mA, V _{CE} =10V f=100MHz	125			MHz
Output Capacitance	Cop	V _{CB} =10V, I _E =0 f=100KHz			4	pF







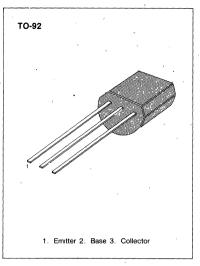


Collector-Emitter Voltage: V_{CES} = 20V
 Collector Dissipation: P_C (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Emitter Voltage	V _{CES}	20	V
Emitter-Base Voltage	V _{EBO}	10	V
Collector Dissipation	Pc	625	mW
Junction Temperature	T,	150	°C
Storage Temperature	Tstg	-55~150	•C

[•] Refer to 2N6427 for graphs



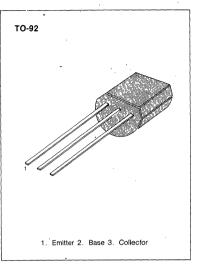
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CES}	I _C =100μA, I _B =0	20			V
Collector Cut-off Current	Ісво	V _{CB} = 15V, I _E = 0			100	nA
Collector Cut-off Current	ICES	V _{CE} =15V, I _B =0			100	nA
Emitter Cutoff Current	I _{EBO}	$V_{BE} = 10V, I_{C} = 0$		1	100	nA
DC Current Gain	hee	$I_{C} = 10 \text{mA}, V_{CE} = 5 \text{V}$	20K			1
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 10 \text{mA}, I_{B} = 0.01 \text{mA}$			1	V
Base-Emitter On Voltage	V _{BE} (on)	I _C =10mA, V _{CE} =5V			1.4	V

- Collector-Emitter Voltage: V_{CES} =30V
- Collector Dissipation: Pc (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	30	V
Collector-Emitter Voltage	V _{CES}	30	V
Emitter-Base Voltage	V _{EBO}	10	V
Collector Current	I _C	500	mA
Collector Dissipation Junction Temperature Storage Temperature	P _C	625	mW
	T _{.j}	150	°C
	Tstg	-55~150	°C

• Refer to 2N6427 for graphs



Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CES}	$I_C = 100 \mu A, I_B = 0$	30			V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 30V, I_{E} = 0$			100	ηA
Emitter Cut-off Current	I _{EBQ}	$V_{BE} = 10V, I_{C} = 0$			100	nA
*DC Current Gain	-h _{FE}	I _C =10mA, V _{CE} =5V	5K			
	*	$I_{\rm C} = 100 \text{mA}, V_{\rm CE} = 5 \text{V}$	10K			
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 100 \text{mA}, I_{B} = 0.1 \text{mA}$			1.5	V
Current Gain-Bandwidth Product	f _T	I _C =10mA, V _{CE} =5V f = 100MHz	125			MHz
*Base-Emitter On Voltage	V _{BE} (on)	$I_C = 100 \text{mA}, V_{CE} = 5 \text{V}$			2	٧

^{*} Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2%

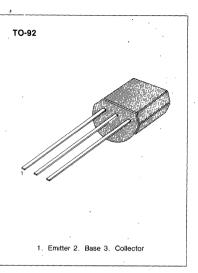
• Collector-Emitter Voltage: V_{CES} = 30V

• Collector Dissipation: Pc (max)=625mW

ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	30	V
Collector-Emitter Voltage	V _{CES}	30	V
Emitter-Base Voltage	V _{EBO}	10	V
Collector Current	l _C	500	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	Ti	150	•C
Storage Temperature	Tstg	−55 ~ 150	•C
1	1 1		1

^{*} Refer to 2N6427 for graphs



Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CES}	$I_{\rm C} = 100 \mu A$, $I_{\rm B} = 0$	30	·····		V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 30V, I_E = 0$	-	•	100	nA
Emitter Cut-off Current	I _{EBO}	$V_{BE} = 10V, I_{C} = 0$			100	nA
*DC Current Gain	h _{FE}	$I_C = 10 \text{mA}, V_{CE} = 5 \text{V}$	10K			1
		$I_{C} = 100 \text{mA}, V_{CE} = 5 \text{V}$	20K		1	1
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 100 \text{mA}, I_{B} = 0.1 \text{mA}$			1.5	V
Current Gain Bandwidth Product	fī	$I_C = 10 \text{mA}, V_{CE} = 5 \text{V}$	125			MHz
tDage Facilities On Malane		f=100MHz				
*Base-Emitter On Voltage	V _{BE} (on)	$I_C = 100 \text{mA}, V_{CE} = 5 \text{V}$			2	V

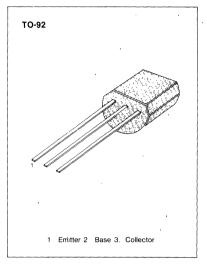
^{*} Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2%

- Collector-Emitter Voltage: V_{CEO} = 40V
- Collector Dissipation: Pc (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Emitter Voltage Emitter-Base Voltage	V _{CEO} V _{EBO}	40 4	V
Collector Current	Ic ·	100 625	mA mW
Collector Dissipation Junction Temperature	P _C T _j	150	°C
Storage Temperature	Tstg	-55∼150	•C

[•] Refer to MPSA10 for graphs



Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
*Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =1mA, I _B =0	40			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 100 \mu A$, $I_C = 0$	4			V
Collector Cut-off Current	I _{CBO}	V _{CB} =30V, I _E =0			100	nA
*DC Current Gain	h _{FE}	I _C =5mA, V _{CE} =10V	40		400	
+Current Gain Bandwidth Product	f _T	I _C =5mA, V _{CE} =10V f=100MHz	125			MHz
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = 10 \text{mA}, I_B = 1 \text{mA}$	1		0.25	V
Output Capacitance	Cob	V _{CB} =10V, I _E =0 f=100KHz			4	pF

^{*} Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2%

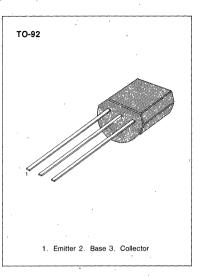
SILICON DARLINGTON TRANSISTOR

DARLINGTON TRANSISTOR

- Collector-Emitter Voltage: V_{CES} =40V
- Collector Dissipation: Pc (max)=625mW

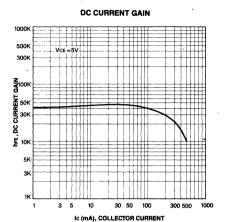
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Emitter Voltage	V _{CES}	40	V
Emitter-Base Voltage	V_{EBO}	10	V
Collector Current	l _c	500	mA
Collector Dissipation	Pc	625	mW.
Junction Temperature	Ti	150 .	°C
Storage Temperature	Tstg	-55~150	°C

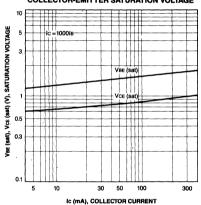


Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CES}	$I_{C} = 100 \mu A, V_{BE} = 0$	40			V
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{\rm C} = 100 \mu A$, $I_{\rm E} = 0$	40			V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 30V, I_E = 0$			100	nA
Emitter Cut-off Current	I _{EBO}	$V_{BE} = 10V, I_{C} = 0$	1 . 1		100	nA
Collector Cut-off Current	ICES	$V_{CF} = 30V, V_{BF} = 0$			500	nA
*DC Current Gain	h _{FE}	I _C =10mA, V _{CE} =5V	.10K			
•	}	$I_{C} = 100 \text{mA}, V_{CE} = 5 \text{V}$	10K			
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 100 \text{mA}, I_{B} = 0.1 \text{mA}$			1.5	V
*Base-Emitter On Voltage	V _{BE} (on)	$I_{C} = 100 \text{mA}, V_{CE} = 5 \text{V}$	'		2	V

^{*}Pulse Test: Width ≤300 µs, Duty Cycle ≤2%



BASE-EMITTER SATURATION VOLTAGE COLLECTOR-EMITTER SATURATION VOLTAGE



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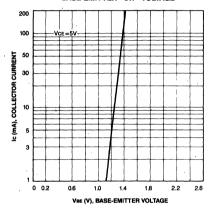
_{*}10

SAFE OPERATING AREA

Vce (V), COLLECTOR-EMITTER VOLTAGE

30

BASE-EMITTER ON VOLTAGE



SILICON DARLINGTON TRANSISTOR

DARLINGTON TRANSISTOR

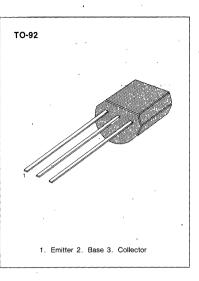
• Collector-Emitter Voltage: V_{CES} = 50V

• Collector Dissipation: Pc (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Junction Temperature Storage Temperature	V _{CES} V _{EBO} I _C P _C Tj Tstg	50 10 500 625 150 -55~150	V V mA mW °C °C

^{*} Refer to MPSA25 for graphs



Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CES}	$I_C = 100 \mu A$, $V_{BE} = 0$	50			V
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{\rm C} = 100 \mu A, I_{\rm E} = 0$	50			. V
Collector Cut-off Current	IcBO	$V_{CB} = 40V, I_{E} = 0$			100	nA
Emitter Cut-off Current	I _{EBO}	$V_{BE} = 10V, I_{C} = 0$			100	nΑ
Collector Cut-off Current	ICES	$V_{CE} = 40V, V_{BE} = 0$			500	nA
*DC Current Gain	h _{FE}	$I_{\rm C} = 10 \rm mA$, $V_{\rm CE} = 5 \rm V$	10K			
•		$I_{C} = 100 \text{mA}, V_{CE} = 5 \text{V}$	10K			1
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 100 \text{mA}, I_{B} = 0.1 \text{mA}$			1.5	V
*Base-Emitter On Voltage	V _{BE} (on)	$I_C = 100 \text{mA}, V_{CE} = 5 \text{V}$			2	V

^{*} Pulse Test: Width $\leq 300 \mu$ s, Duty Cycle $\leq 2\%$.

3

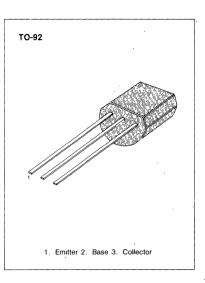
DARLINGTON TRANSISTOR

Collector-Emitter Voltage: V_{CES} = 60V
 Collector Dissipation: P_C (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Emitter Voltage Emitter-Base Voltage Collector Current Collector Dissipation Junction Temperature Storage Temperature	V _{CES} V _{EBO} I _C P _C Tj Tstg	60 10 500 625 150 –55~150	V V mA mW °C °C
Collector Dissipation Junction Temperature	P _c	625 150	n

^{*} Refer to MPSA25 for graphs



Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CES}	$I_{C} = 100 \mu A, V_{BE} = 0$	60			V
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 100 \mu A, I_{E} = 0$	60			V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 50V, I_{E} = 0$			100	nA
Emitter Cut-off Current	I _{EBO}	$V_{BE} = 10V, I_{C} = 0$			100	nA
Collector Cut-off Current	ICES	V _{CE} =50V, V _{BE} =0			500	nA
*DC Current Gain	hee	I _C =10mA, V _{CE} =5V	10K			1
•		I _C =100mA, V _{CE} =5V	10K			1
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{\rm C} = 100 \text{mA}, I_{\rm B} = 0.1 \text{mA}$			1.5	V
*Base-Emitter On Voltage	V _{BE} (on)	I _C =100mA, V _{CE} =5V			2	v

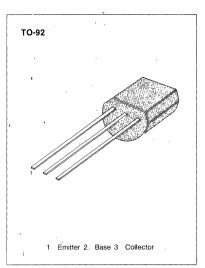
^{*} Pulse Test: Width ≤300 µs, Duty Cycle ≤2%

• Collector-Emitter Voltage: V_{CEO} = 300V

• Collector Dissipation: Pc (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

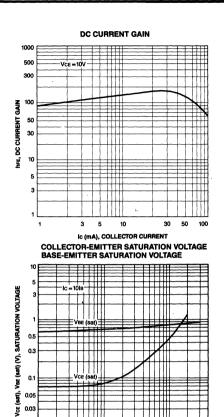
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	300	٧
Collector-Emitter Voltage	V _{CEO}	300	V
Emitter-Base Voltage	V _{EBO}	6	V
Collector Current	l _C	500	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	T.i	150	°C
Storage Temperature	Tstg	−55 ~ 150	°C



Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
*Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =1mA, I _B =0	300	,		٧
Collector-Base Breakdown Voltage	BV _{CBO}	$I_C = 100 \mu A, I_E = 0$	300			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 100 \mu A$, $I_C = 0$	6			· V
Collector Cut-off Current	Ісво	V _{CB} =200V, I _E =0			100	nA
Emitter Cut-off Current	I _{EBO}	$V_{BE} = 6V, I_{C} = 0$,	100	nA
*DC Current Gain	h _{FE}	I _C =1mA, V _{CE} =10V	25			
,		I _C =10mA, V _{CE} =10V	40			
	,	$I_{\rm C} = 30 \text{mA}, V_{\rm CE} = 10 \text{V}$	40			}
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = 20 \text{mA}$, $I_B = 2 \text{mA}$			0.5	V
*Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_C = 20 \text{mA}, I_B = 2 \text{mA}$			0.9	V
Current Gain Bandwidth Product	f _T	$I_C = 10 \text{mA}, V_{CE} = 20 \text{V}$ f = 100 MHz	50			MHz
Collector-Base Capacitance	Ccb	V _{CB} =20V, I _E =0 f=1MHz	, ,	,	3	ρF

^{*} Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2%

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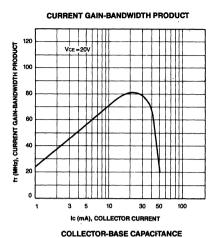
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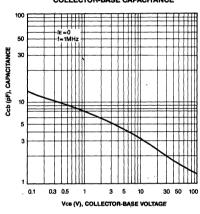
100

300

10

Ic (mA), COLLECTOR CURRENT





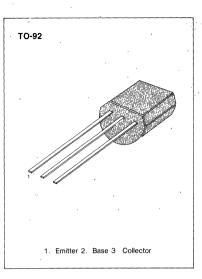
• Collector-Emitter Voltage: V_{CEO} = 200V

• Collector Dissipation: Pc (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	200	· V
Collector-Emitter Voltage	V _{CEO}	200	V-
Emitter-Base Voltage	V _{EBO}	6	V
Collector Current	Ic	500	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	T.j	150	°C
Storage Temperature	Tstg	-55~150	°C

Refer to MPSA42 for graphs

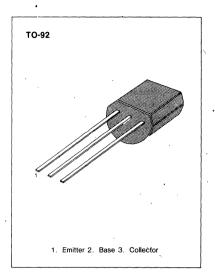


Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =1mA, I _B =0	200			. v
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 100 \mu A, I_{E} = 0$	200			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 100 \mu A$, $I_C = 0$	6			V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 160V, I_E = 0$			100	nΑ
Emitter Cut-off Current	I _{EBO}	$V_{BE} = 4V, I_{C} = 0$			100	nA
*DC Current Gain	h _{EE}	$I_C = 1 \text{mA}, V_{CE} = 10 \text{V}$	25			
		$I_{C} = 10 \text{mA}, V_{CF} = 10 \text{V}$	40		1	
		I _C = 30mA, V _{CF} = 10V	40			,
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =20mA, I _B =2mA	1.		0.5	V
*Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C = 20mA, I _B = 2mA	1.		0.9	V
Collector-Base Capacitance	Cch	V _{CB} = 20V, I _E = 0			4	pF
	-65	f=1MHz				
Current Gain Bandwidth Product	f⊤	I _C =10mA, V _{CE} =20V	50			MHz
		f=100MHz				

^{*}Pulse Test: Pulse Width≤300µs, Duty Cycle≤2%

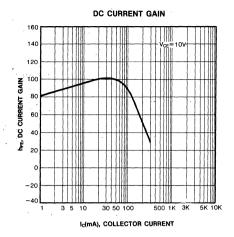
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

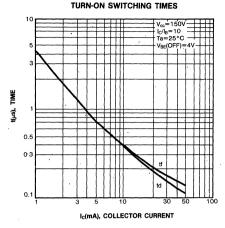
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	500	v
Collector-Emitter Voltage	V _{CEO}	400	V
Emitter-Base Voltage	V _{EBO}	6	V
Collector Current	l _C	300	mA
Collector Dissipation (T _a =25°C)	Pc	625	mW
Collector Dissipation (T _c =25°C)	P _C	1.5	w
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55~150	°C

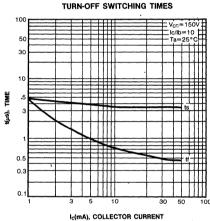


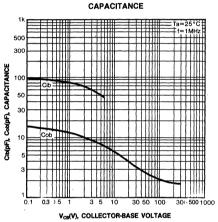
Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Base Breakdown Voltag	BV _{CBO}	$I_{C}=100\mu A, I_{E}=0$	500		· v
*Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C=1$ mA, $I_B=0$	400		V
Collector-Emitter Breakdown Voltage	BV _{CES}	$I_C = 100 \mu A, V_{BE} = 0$	500		. v
Emitter Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	6		V
Collector Cutoff Current	I _{CBO}	V _{CB} =400V, I _E =0		0.1	μΑ
Collector Cutoff Current	I _{CES}	V _{CE} =400V, V _{BE} =0	,	, 500	nA
Emitter Cutoff Current	I _{EBO} .	. V _{EB} =4V, I _C =0		0.1	μΑ
*DC Current Gain	h _{FE}	$V_{CE}=10V$, $I_{C}=1$ mA	40		
• •		V _{CE} =10V, I _C =10mA	50	200	
•		$V_{CE}=10V$, $I_{C}=50mA$	45		
·		$V_{CE} = 10V, I_{C} = 100mA$	40		
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C=1$ mA, $I_B=0.1$ mA		0.4	V
		I _C =10mA, I _B =1mA		0.5	V
		I _C =50mA, I _B =5mA		0.75	V
*Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =10mA, I _B =1mA		0.75	V
Output Capacitance	Cob	$V_{CB}=20V$, $I_E=0$, $f=1MHz$	·	7	pF

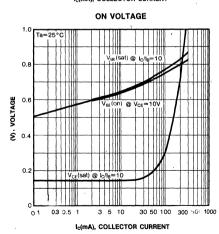
^{*}Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2%

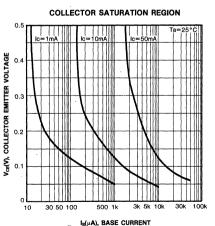


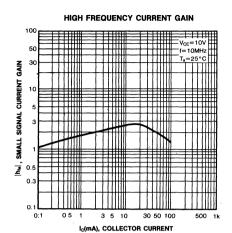


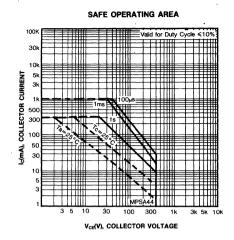








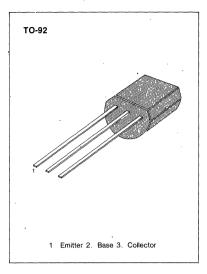




- Collector-Emitter Voltage: V_{CEO} = 350V
- Collector Dissipation: Pc (max)=625mW

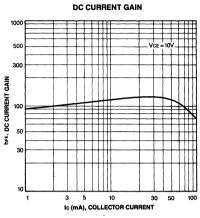
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

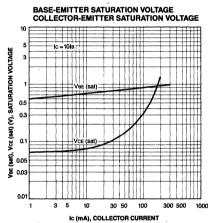
Characteristic	Symbol	Rating	Unit	
Collector-Base Voltage	V _{CBO}	400	V	
Collector-Emitter Voltage	V _{CEO}	350	V	
Emitter-Base Voltage	V _{EBO}	6	V	
Collector Current	lc	300	mA	
Collector Dissipation	P _C	625	mW	
Junction Temperature	T.i	150	°C	
Storage Temperature	Tstg	-55~150	•c	

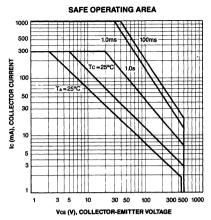


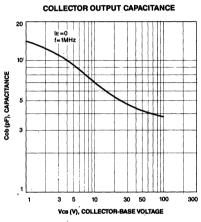
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
*Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =1mA, I _B =0	350			V
Collector-Emitter Breakdown Voltage	BV _{CES}	$I_{\rm C} = 100 \mu A, V_{\rm BE} = 0$	400			V
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{\rm C} = 100 \mu A, I_{\rm E} = 0$	400			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_{E} = 10 \mu A, I_{C} = 0$	6 .			V
Collector Cut-off Current	№сво	$V_{CB}=320V, I_{E}=0$			100	nA
Emitter Cut-off Current	I _{EBO}	$V_{BE} = 4V, I_{C} = 0$			100	nA
Collector Cutoff Current	I _{CES}	$V_{CE} = 320V, V_{BE} = 0$			500	nA
*DC Current Gain	h _{FE}	I _C =1mA, V _{CE} =10V	40			
•		$I_{C} = 10 \text{mA}, V_{CE} = 10 \text{V}$	50		200	
		$I_{C} = 50 \text{mA}, V_{CE} = 10 \text{V}$	45			
•		$I_{C} = 100 \text{mA}, V_{CE} = 10 \text{V}$	40			
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 1 \text{mA}, I_{B} = 0.1 \text{mA}$		*	0.4	V
_	,	$I_C = 10 \text{mA}$, $I_B = 1 \text{mA}$			0.5	V
-		I _C =50mA, I _B =5mA			0.75	V
*Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =10mA, I _B =1mA			0.75	V
Output Capacitance	Cob	V _{CB} = 20V, I _E = 0 f=1MHz			7	pF

^{*} Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2%





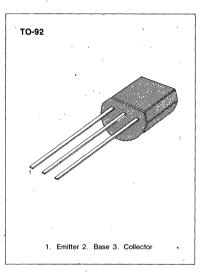




- Collector-Emitter Voltage: V_{CEO} =60V
- Collector Dissipation: Pc (max)=625mW

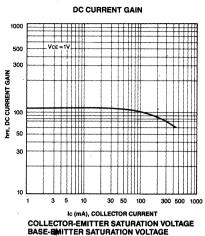
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

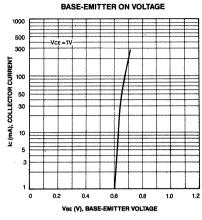
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	60	V
Collector-Emitter Voltage	V _{CEO}	60	V
Emitter-Base Voltage	V _{EBO}	4	V
Collector Current	l _c	500	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	Ti	150	•c
Storage Temperature	Tstg	-55 ~ 150	°C

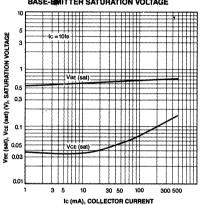


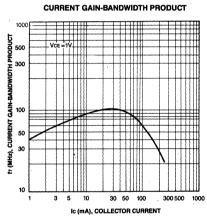
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
*Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =1mA, I _B =0	60			· v
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 100 \mu A$, $I_C = 0$	4			V
Collector Cut-off Current	I _{CEO}	V _{CE} = 60V, I _B = 0	,		100	n-A
Collector Cut-off Current	I _{CBO}	V _{CB} = 60V, I _E = 0			100	nA
DC Current Gain	h _{FE}	$I_{C} = 10 \text{mA}, V_{CE} = 1 \text{V}$	50			
		$I_{C} = 100 \text{mA}, V_{CE} = 1 \text{V}$	50	'		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =100mA, I _B =10mA			0.25	V
Current Gain Bandwidth Product	fr	$I_{C} = 100 \text{mA}, V_{CE} = 1 \text{V}$	50			MHz
	·	f=100MHz				
Base-Emitter On Voltage	V _{BE} (on)	I _C =100mA, V _{CE} =1V			1.2	v

^{*} Pulse Test: Pulse Width≤300µs, Duty Cycle≤2%







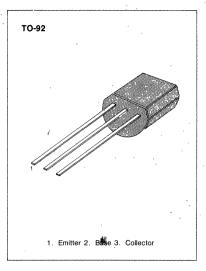


- Collector-Emitter Voltage: V_{CEO} = 80V
- Collector Dissipation: Pc (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	80	٧ ٠
Collector-Emitter Voltage	V _{CEO}	80	V .
Emitter-Base Voltage	I _{CEO}	4	V
Collector Current	Ic	500	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	Ti	150	•c
Storage Temperature	Tstg	-55~150	°C

^{*} Refer to MPSA55 for graphs



Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
*Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =1mA, I _B =0	80	. •		V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 100 \mu A$, $I_C = 0$	4			V
Collector Cut-off Current	ICEO	$V_{CE} = 60V, I_B = 0$		1	100	nA
Collector Cut-off Current	I _{CBO}	$V_{CB} = 80V, I_{E} = 0$			100	nA
DC Current Gain	h _{FE}	$I_C = 10 \text{mA}, V_{CE} = 1 \text{V}$	50			
	1	$I_{C} = 100 \text{mA}, V_{CE} = 1 \text{V}$	50			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 100 \text{mA}, I_{B} = 10 \text{mA}$			0.25	V
Current Gain Bandwidth Product	f _T	I _C = 100mA, V _{CE} = 1V f=100MHz	50			MHz
Base-Emitter On Voltage	V _{BE} (on)	I _C =100mA, V _{CE} =1V			1.2	V

^{*} Pulse Test: Pulse Width<300µs, Duty Cycle<2%

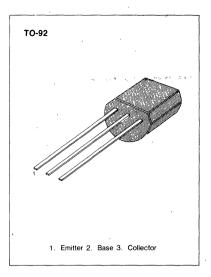
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DARLINGTON TRANSISTOR

- Collector-Emitter Voltage: V_{CES} = 20V
- Collector Dissipation: Pc (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Symbol	Rating	Unit
V _{CES}	. 20	V
V _{CBO}	. 20	V
V _{EBO}	10	V
Ic	500	mA
P _C	625	mW
T.i	150	°C
Tstg	-55~150	°C
	VCES VCBO VEBO IC PC	V _{CES} 20 V _{CBO} 20 V _{EBO} 10 I _C 500 P _C 625 T _J 150

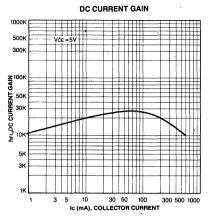


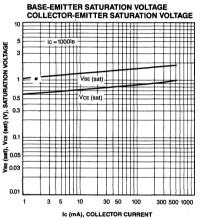
ELECTRICAL CHARACTERISTICS (Ta=25°C)

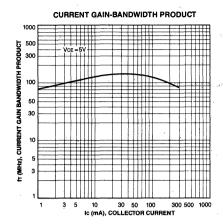
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Emitter Breakdown Voltage Collector Cut-off Current Emitter Cut-off Current *DC Current Gain *Collector-Emitter Saturation Voltage *Base-Emitter On Voltage	BV _{CES} I _{CBO} I _{EBO} • h _{FE} V _{CE} (sat) V _{BE} (on)	$\begin{split} I_{C} = &100 \mu A, V_{BE} = 0 \\ V_{CB} = &15 V, I_{E} = 0 \\ V_{BE} = &10 V, I_{C} = 0 \\ I_{C} = &10 mA, V_{CE} = 5 V \\ I_{C} = &10 mA, I_{B} = 0.01 mA \\ I_{C} = &10 mA, V_{CE} = 5 V \end{split}$	20 20K		100 100 1.0 1.4	V nA nA V V

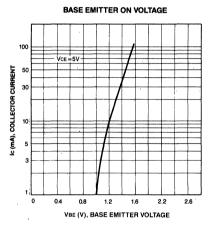
* Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2%

PNP EPITAXIAL SILICON DARLINGTON TRANSISTOR









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DARLINGTON TRANSISTOR

• Collector-Emitter Voltage: V_{CES} =30V

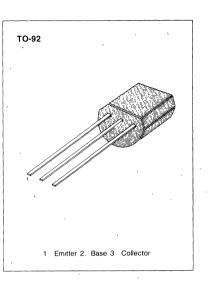
• Collector Dissipation: Pc (max)=625mW

Characteristic	Symbol	Rating	Unit
Collector-Emitter Voltage	V _{CES}	30	V
Collector-Base Voltage	V _{CBO}	30	· v
Emitter-Base Voltage	V _{EBO}	10	V
Collector Current	Ic	500	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	T _{.j}	150	°C

Tstg

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Storage Temperature



ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Emitter Breakdown Voltage Collector Cut-off Current Emitter Cut-off Current *DC Current Gain *Collector-Emitter Saturation Voltage *Base-Emitter On Voltage Current Gain Bandwidth Product	BV _{CES} I _{CBO} I _{EBO} h _{FE} V _{CE} (sat) V _{BE} (on) f _T	$\begin{split} &I_{C}=100\mu\text{A}, \forall_{\text{BE}}=0\\ &\forall_{\text{CB}}=30\text{V},I_{E}=0\\ &\forall_{\text{BE}}=10\text{V},I_{C}=0\\ &I_{C}=10\text{mA},\forall_{\text{CE}}=5\text{V}\\ &I_{C}=100\text{mA},\forall_{\text{CE}}=5\text{V}\\ &I_{C}=100\text{mA},I_{B}=0.1\text{mA}\\ &I_{C}=100\text{mA},V_{CE}=5\text{V}\\ &I_{C}=100\text{mA},V_{CE}=5\text{V}\\ &I_{C}=100\text{mA},V_{CE}=5\text{V}\\ &I_{C}=100\text{mA},V_{CE}=5\text{V}\\ \end{split}$	30 5K 10K		100 100 1.5 2	V nA nA V V MHz

-55~150

°C

Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%

[•] Refer to MPSA62 for graphs

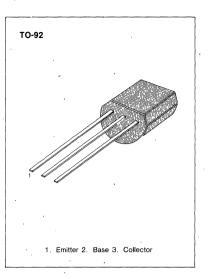
• Collector-Emitter Voltage: V_{CES} = 30V

• Collector Dissipation: Pc (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Emitter Voltage	V _{CES}	. 30	V
Collector-Base Voltage	V _{CBO}	30	V
Emitter-Base Voltage	V_{EBO}	10	V
Collector Current	Ic	500	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55~150	°C

[•] Refer to MPSA62 for graphs



Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CES}	$I_C = 100 \mu A, V_{BE} = 0$	30			V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 30V, I_{E} = 0$			100	nA
Emitter Cut-off Current	I _{EBO}	$V_{BE} = 10V, I_{C} = 0$	1		100	nA
*DC Current Gain	h _{FE}	$I_C = 10 \text{mA}, V_{CE} = 5 \text{V}$	10K			
		$I_{\rm C} = 100 \text{mA}, V_{\rm CE} = 5 \text{V}$	20K		İ	
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 100 \text{mA}, I_{B} = 0.1 \text{mA}$	1		1.5	V.
*Base-Emitter On Voltage	V _{BE} (on)	I _C = 100mA, V _{CE} = 5V			2	V
Current Gain Bandwidth Product	f _T	I _C =100mA, V _{CE} =5V f=100MHz	125		_	MHz

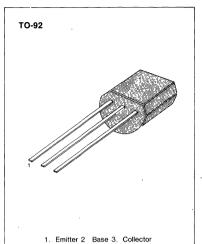
^{*}Pulse Test: Pulse Width≤300µs, Duty Cycle≤2%

• Collector-Emitter Voltage: V_{CEO} =40V

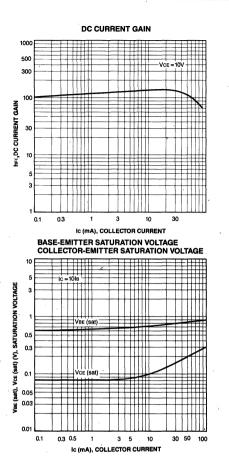
• Collector Dissipation: Pc (max)=625mW

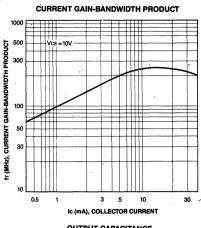
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

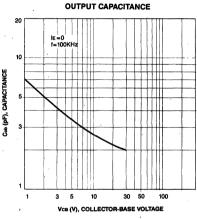
Characteristic	Symbol	Rating	Unit
Collector-Emitter Voltage	V _{CEO}	40	V
Emitter-Base Voltage	V _{EBO}	4	V
Collector Current	l _c	100	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55 ~ 150	•c



Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =1mA, I _B =0	40	, , , , , ,		٧
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 100 \mu A, I_C = 0$	4			V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 30V, I_{E} = 0$			100	'nA
DC Current Gain	h _{FE}	$I_{C} = 5mA, V_{CE} = 10V$	40		400	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = 10 \text{mA}, I_B = 1 \text{mA}$			0.25	V
Current Gain Bandwidth Product	f⊤	I _C =5mA, V _{CE} =10V f=100MHz	125			MHz
Output Capacitance	Cob.	V _{CB} = 10V, I _E = 0 f = 100KHz			4	pF



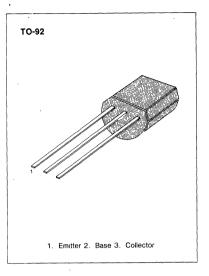




- Collector-Emitter Voltage: V_{CES} = 40V
- Collector Dissipation: Pc (max)=625mW

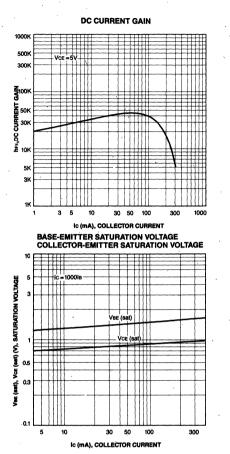
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

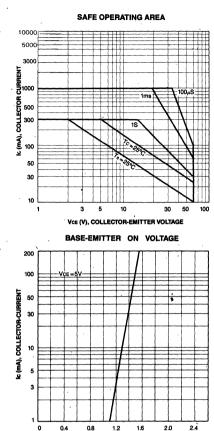
Characteristic	Symbol	Rating	Unit
Collector-Emitter Voltage	V _{CES}	40	v
Emitter-Base Voltage	V _{EBO}	10	V
Collector Current	Ic	500	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	Ti	150	°C
Storage Temperature	Tstg	-55~150	°C



Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CES}	$I_{C} = 100 \mu A, V_{BE} = 0$	40			٧
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{\rm C} = 100 \mu A, I_{\rm E} = 0$	40			V
Collector Cut-off Current	I _{CBO}	$V_{CB} = 30V, I_{E} = 0$	İ		100	nA
Emitter Cut-off Current	I _{EBO}	$V_{BE} = 10V, I_{C} = 0$. 100	nA
Collector Cut-off Current	ICES	V _{CE} = 30V, V _{BE} = 0			500	nA
DC Current Gain	h _{FE}	$I_C = 10 \text{mA}, V_{CE} = 5 \text{V}$	10K		}	ł
		I _C =100mA, V _{CE} =5V	10K		1	Ì
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 100 \text{mA}, I_{B} = 0.1 \text{mA}$			1.5	V
Base-Emitter On Voltage	V _{BE} (on)	I _C =100mA, V _{CE} =5V			2	V

PNP EPITAXIAL SILICON DARLINGTON TRANSISTOR





VBE (V), BASE-EMITTER VOLTAGE

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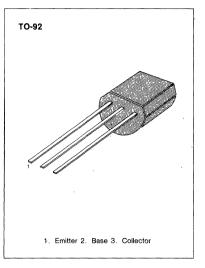
DARLINGTON TRANSISTOR

Collector-Emitter Voltage: V_{CES}=50V
 Collector Dissipation: P_C (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Emitter Voltage	V _{CES}	50	V
Emitter-Base Voltage	V _{EBO}	10	V
Collector Current	l _c	500	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	Ti	150	°C
Storage Temperature	Tstg	−55∼150	°C

• Refer to MPSA75 for graphs



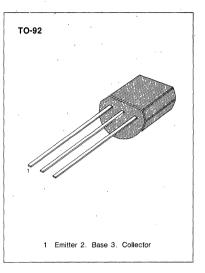
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CES}	$I_{C} = 100 \mu A, V_{BE} = 0$	50			V
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{\rm C} = 100 \mu A, I_{\rm E} = 0$	50			V
Collector Cut-off Current	Ісво	$V_{CB} = 40V, I_{E} = 0$			100	nA
Emitter Cut-off Current	I _{EBO}	$V_{BE} = 10V, I_{C} = 0$	1		100	nA
Collector Cut-off Current	ICES	$V_{CE} = 40V, V_{BE} = 0$			500	nA
DC Current Gain	h _{FE}	$I_C = 10 \text{mA}, V_{CE} = 5 \text{V}$	10K			
	,	$I_{C} = 100 \text{mA}, V_{CE} = 5 \text{V}$	10K			
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 100 \text{mA}, I_{B} = 0.1 \text{mA}$		•	1.5	V
Base-Emitter On Voltage	V _{BE} (on)	I _C =100mA, V _{CE} =5V			2	V

- Collector-Emitter Voltage: V_{CES} = 60V
- Collector Dissipation: Pc (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Emitter Voltage	V _{CES}	60	V
Emitter-Base Voltage	V _{EBO}	10	V
Collector Current	Ic	500	mA
Collector Dissipation	P _C	625	mW
Junction Temperature	Ti	150	°C
Storage Temperature	Tstg	÷55 ~ 150	°C

[•] Refer to MPSA75 for graphs

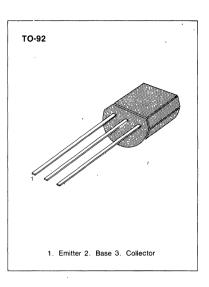


ELECTRICAL CHARACTERISTICS (T_A = 25°C)

Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Emitter Breakdown Voltage	BV _{CES}	$I_C = 100 \mu A$, $V_{BE} = 0$	60		*.	V
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 100 \mu A, I_{E} = 0$	60			V
Collector Cut-off Current	Ісво	$V_{CB} = 50V, I_E = 0$			100	nA
Emitter Cut-off Current	I _{EBO}	$V_{BE} = 10V, I_{C} = 0$			100	nA
Collector Cut-off Current	Ices	$V_{CE} = 50V, V_{BE} = 0$			500	nA
DC Current Gain	h _{FE}	$I_C = 10 \text{mA}, V_{CE} = 5 \text{V}$	-10K			1
	,	$I_{C} = 100 \text{ mA}, V_{CE} = 5 \text{ V}$	10K		l	1
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = 100 \text{ mA}, I_{B} = 0.1 \text{ mA}$			1.5	V
Base-Emitter On Voltage	V _{BE} (on)	$I_C = 100 \text{mA}, V_{CE} = 5 \text{V}$			2	V

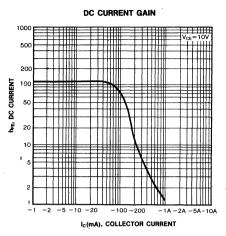
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

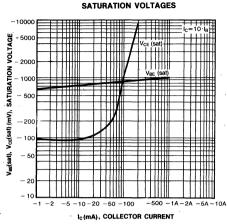
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage : MPSA92	V _{CBO}	-300	V
: MPSA93		-200	· v
Collector-Emitter Voltage: MPSA92	V _{CEO}	-300	v
: MPSA93		-200	V
Emitter-Base Voltage	V _{EBO}	-5	v
Collector Current	l _c	-500	mA
Collector Dissipation (T _a =25°C)	Pc	625	mW
Derate above 25°C		5	mW/°C
Collector Dissipation (T _c =25°C)	Pc	1.5	W
Derate above 25°C		12	mW/°C
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	_55∼150	°C

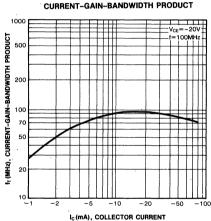


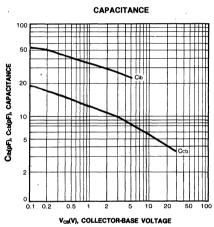
Characteristic		Symbol	Test Condition	Min	Max	Unit
Collector Base Breakdown Voltage	: MPSA92	BV _{CBO}	$I_C = -100\mu A, I_E = 0$	-300		V
	: MPSA93		• .	-200		V
*Collector Emitter Breakdown Voltage	: MPSA92	BV _{CEO}	$I_C = -1 \text{ mA}, I_B = 0$	-300		V
	: MPSA93			-200		v
Emitter Base Breakdown Voltage		BV _{EBO}	$I_E = -100 \mu A, I_C = 0$	-5		v
Collector Cutoff Current	: MPSA92	I _{CBO}	$V_{CB} = -200V, I_{E} = 0$		-0.25	μΑ
,	: MPSA93		$V_{CB} = -160V$, $I_E = 0$		-0.25	μΑ
Emitter Cutoff Current		I _{EBO}	$V_{EB} = -3V, I_{C} = 0$		-0.10	μΑ
* DC Current Gain		h _{FE}	$V_{CE} = -10V, I_{C} = -1mA$	25		l
			$V_{CE} = -10V, I_{C} = -10mA$	40		
			$V_{CE} = -10V, I_{C} = -30mA$	25		
*Collector-Emitter Saturation Voltage		V _{CE} (sat)	$I_C = -20 \text{mA}, I_B = -2 \text{mA}$		-0.50	V
*Base-Emitter Saturation Voltage		V _{BE} (sat)	$I_C = -20 \text{mA}, I_B = -2 \text{mA}$		-0.90	v
Current Gain Bandwidth Product		f _T	$V_{CE} = -20V, I_{C} = -10mA$	50		MHz
•			f=100MHz			
Collector Base Capacitance :	MPSA92	Ccb	$V_{CB} = -20V, I_{E} = 0$		6	pF
:	MPSA93		f=1MHz		8	pF

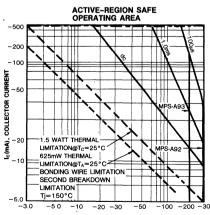
^{*} Pulse Test: PW≤300µs, Duty Cycle≤2%









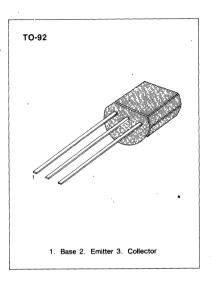


 $V_{CE}(V)$, COLLECTOR-EMITTER VOLTAGE

VHF/UHF TRANSISTOR

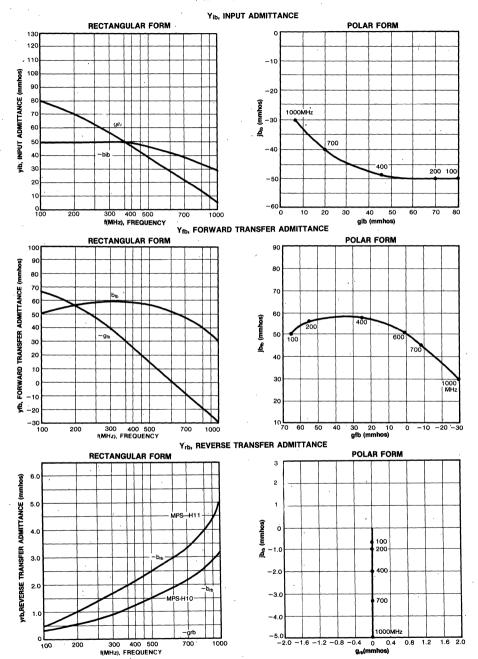
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

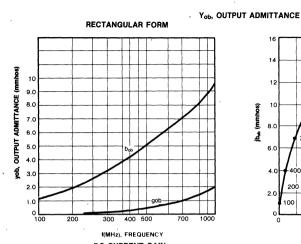
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	30	>
Collector-Emitter Voltage	V_{CEO}	25	V
Emitter-Base Voltage	V_{EBO}	3.0	V
Collector Dissipation (T _a =25°C)	Pc	350	mW
Derate above 25°C		2.8	mW/°C
Collector Dissipation (T _C =25°C)	Pc	1.0	w .
Derate above 25°C		8.0	mW/°C
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55~150	°C.
Thermal Resistance, Junction to Case	Rth(j-c)	125	°C/W
Thermal Resistance, Junction to Ambient	Rth(j-a)	357	°C/W

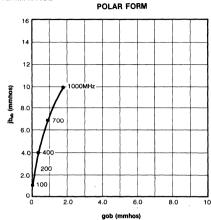


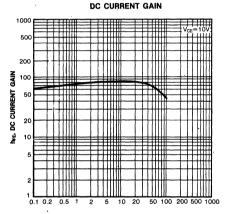
Characteristic	Symbol	Test Condition	Min	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C}=100\mu A, I_{E}=0$	30		٧
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C=1$ mA, $I_B=0$	25		V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	3.0	}	V
Collector Cutoff Current	I _{CBO}	$V_{CB} = 25V, I_{E} = 0$		100	nA
Emitter Cutoff Current	I _{EBO}	$V_{EB}=2V$, $I_{C}=0$		100	nA
DC Current Gain	h _{FE}	$V_{CE}=10V$, $I_{C}=4mA$	60		
Collector Emitter Saturation Voltage	V _{CE} (sat)	$I_C=4mA$, $I_B=0.4mA$		0.5	V
Base-Emitter On Voltage	V _{BE} (on)	$V_{CE}=10V$, $I_{C}=4mA$		0.95	V
Current Gain Bandwidth Product	f _T	$V_{CE}=10V$, $I_{C}=4mA$, $f=100MHz$	650		MHz
Collector Base Capacitance	Ccb	$V_{CB}=10V$, $I_{E}=0$, $f=1MHz$		0.7	pF
Collector Base Feedback Capacitance	Crb	$V_{CB}=10V$, $I_{E}=0$, $f=1MHz$			
MPSH10			0.35	0.65	pF
MPSH11			0.6	0.9	pF
Collector Base Time Constant	Cc·rbb'	$V_{CB}=10V$, $I_{C}=4mA$, $f=31.8MHz$	•	9.0	ps

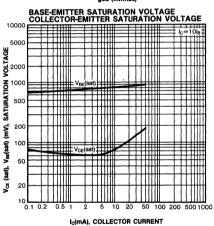
COMMON-BASE y PARAMETERS vs FREQUENCY $(V_{CB} = 10V, I_C = 4mA, T_a = 25^{\circ}C)$

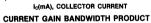


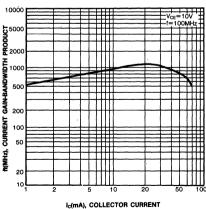








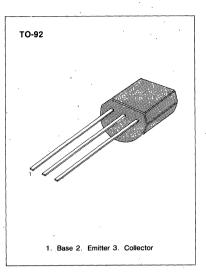




CATY TRANSISTOR

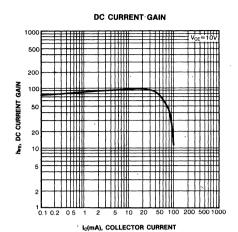
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

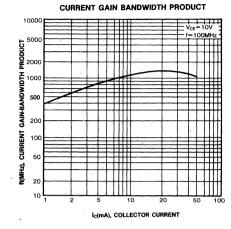
Characteristic	Symbol	Rating	. Unit
Collector-Base Voltage	V_{CBO}	20	V
Collector-Emitter Voltage	V_{CEO}	15	V
Emitter-Base Voltage	V_{EBO}	3.0	V
Collector Dissipation (T _a =25°C)	Pc	625	mW
Derate above 25°C		5.0	mW/°C
Junction Temperature	Tj ·	150	°C
Storage Temperature	Tstg	-55~150	°C
Thermal Resistance, Junction to Ambient	Rth(j-a)	200	°C/W

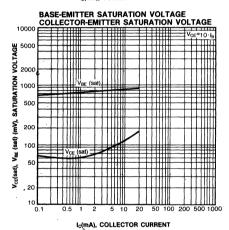


ELECTRICAL CHARACTERISTICS (Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =100μA, I _E =0	20			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C=1$ mA, $I_B=0$	15			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	3.0			V
Collector Cutoff Current	I _{CBO}	$V_{CB} = 15V, I_E = 0$			100	nA
DC Current Gain	h _{FE}	V _{CE} =10V, I _C =5mA	25		250	
Collector Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1mA			0.5	V
Current Gain Bandwidth Product	f _T	V _{CE} =10V, I _C =5mA f=100MHz	800			MHz
Collector-Base Capacitance	Ccb	V _{CB} =10V, I _E =0, f=1MHz	0.3		0.9	pF
Small Signal Current Gain	hfe .	V_{CE} =10V, I_{C} =5mA f=1KHz	30			
Noise Figure	NF	$V_{cc}=12V$, $I_c=5mA$ $R_s=50\Omega$, $f=200MHz$			6.0	· dB
.Amplifier Power Gain	Gpe	$V_{CC}=12V$, $I_{C}=5mA$ $R_{S}=50\Omega$, $f=200MHz$	-	24		dB
		1			Į.	



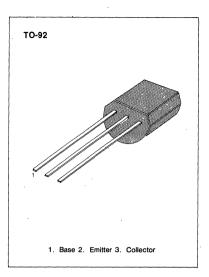




VHF TRANSISTOR

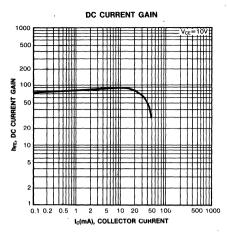
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

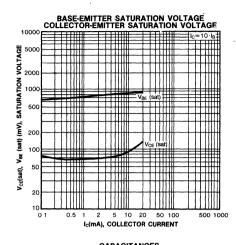
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage Collector-Emitter Voltage Emitter-Base Voltage	V _{CBO} V _{CEO} V _{EBO}	40 30 4.0	V , V
Collector Current Collector Dissipation (T _a =25°C)	I _C P _C	100 350	mA mW
Derate above 25°C Collector Dissipation (T _C =25°C) Derate above 25°C	Pç	2.81 1.0 8.0	mW/°C W mW/°C
Junction Temperature Storage Temperature	Tstg	150 −55~150	°C
Thermal Resistance, Junction to Case Thermal Resistance, Junction to Ambient		83.3 357	°C/W

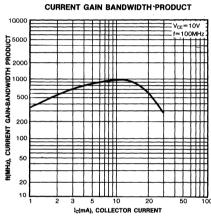


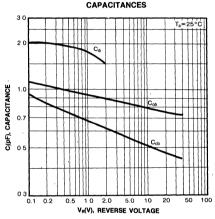
ELECTRICAL CHARACTERISTICS (Ta=25°C)

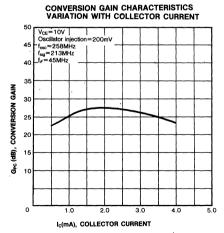
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit ·
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =100μA, I _E =0	40			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C = 1 \text{ mA}, I_B = 0$	30			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	4.0			V
Collector Cutoff Current	I _{CBO}	$V_{CB} = 15V, I_E = 0$			50	nA:
DC Current Gain	h _{FE}	V _{CE} =10V, I _C =4mA	25			
Current Gain Bandwidth Product	f⊤	V _{CE} =10V, I _C =4mA f=100MHz	400	620		MHz
Collector-Base Capacitance	Ccb	$V_{CB} = 10V, I_E = 0, f = 1MHz$		0.5	0.65	pF
Collector Base Time Constant	Cc rbb'	V _{CB} =10V, I _E =4mA f=31.8MHz		10		ps
Conversion Gain (213 to 45 MHz)	GCE	V _{CE} =10V, I _C =4mA Oscillator injection=200mV	18	23		dB

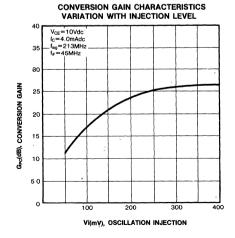


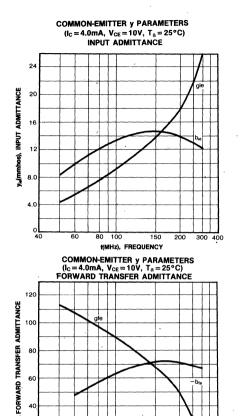


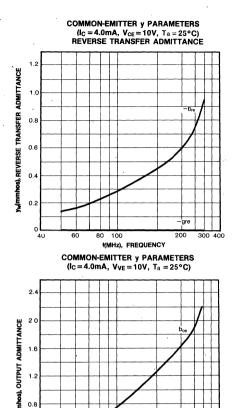












80 100

f(MHz), FREQUENCY

40

300 400

200

0

40

60 80 100

f(MHz), FREQUENCY

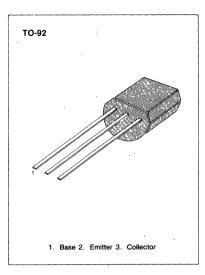
200

300 400

VHF TRANSISTOR

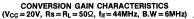
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

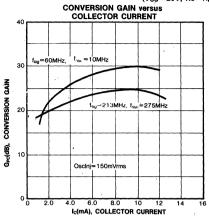
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	40	·v
Collector-Emitter Voltage	V _{CEO} '	30	V
Emitter-Base Voltage	V_{EBO}	4.0	V
Collector Current	l _c	100	mA
Collector Dissipation (T _a =25°C)	Pc	350	mW
Derate above 25°C		2.8	mW/°C
Junction Temperature	Tj	135	°C
Storage Temperature	Tstg	_55~135	°C
Thermal Resistance, Junction to Ambien	, -	357	°C/W

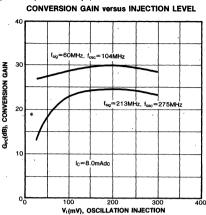


ELECTRICAL CHARACTERISTICS (Ta=25°C)

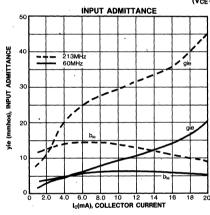
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =100μA, I _E =0	40			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C=1 \text{ mA}, I_B=0$	30			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	4.0			V
Collector Cutoff Current	I _{CBO}	$V_{CB} = 15V, I_{E} = 0$			50	nA
DC Current Gain	h _{FE}	V _{CE} =10V, I _C =8mA	30			
Current Gain Bandwidth Product	f _T	$V_{CE}=10V$, $I_{C}=8mA$ f=100MHz	400	620		MHz
Collector-Base Capacitance	Ccb	$V_{CB} = 10V, I_{E} = 0, f = 1MHz$		0.25	0.36	pF
Conversion Gain (213 to 45 MHz)	GCE	$V_{cc}=20V$, $I_c=8mA$.19	24		dB
Conversion Gain (60 to 45 MHz)	GCE	Oscillator injection=150mV V _{CC} =20V, I _C =8mA Oscillator injection=150mV	24	29		dB

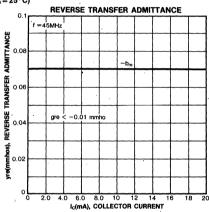


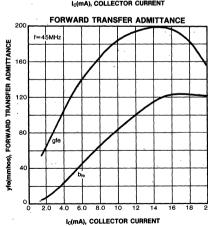


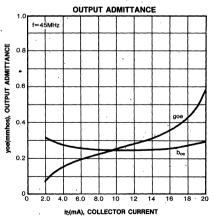


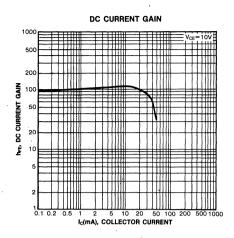
COMMON-BASE y PARAMETERS ($V_{CE} = 15V$, $T_a = 25$ °C)

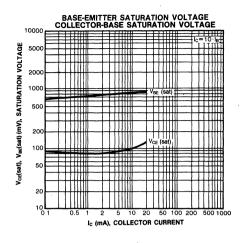


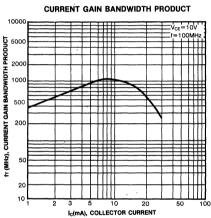










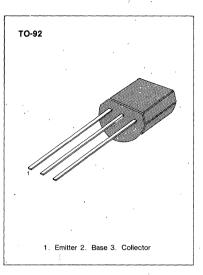


AMPLIFIER TRANSISTOR

Collector-Emitter Voltage: V_{CEO} = 120V
 Collector Dissipation: P_C (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

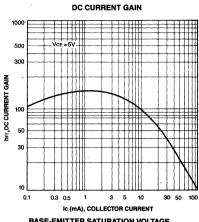
Characteristic	Symbol	Rating	Unit	
Collector-Base Voltage	V _{CBO}	140	٧.	
Collector-Emitter Voltage	V _{CEO}	120	V	
Emitter-Base Voltage	V _{EBO}	5	V	
Collector Current	Ic	150	mA	
Collector Dissipation	Pc	625	mW	
Junction Temperature	Tj	150	°C	
Storage Temperature	Tstg	-55~150	°C	

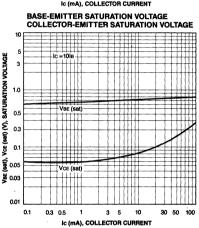


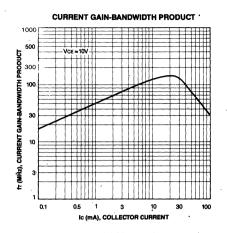
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

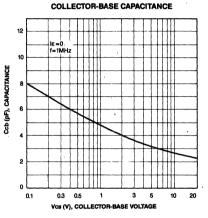
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
*Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =1mA, I _B =0	120			V
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{\rm C} = 100 \mu A$, $I_{\rm E} = 0$	140			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	5			V
Collector Cut-off Current	Ісво	$V_{CB} = 75V, I_{E} = 0$	1		1	μΑ
Emitter Cut-off Current	I _{EBO}	$V_{BE} = 4V, I_{C} = 0$	1		100	nA
*DC Current Gain	h _{FE}	$_{e}I_{C} = 10 \text{mA}, V_{CE} = 5 \text{V}$	50	,	300	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_C = 10mA$, $I_B = 1mA$	1		0.2	V
		I _C =50mA, I _B =5mA	,		0.3	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =10mA, I _B =1mA	1.		1.2	V
	(/	*I _C =50mA, I _B =5mA			1.4	V
Collector-Base Capacitance	Ccb	V _{CB} = 10V, I _E = 0			8	pF
·		f=1MHz				'
*Current Gain Bandwidth Product	fī	I _C =10mA, V _{CE} =10V f=100MHz	60			MHz

^{*} Pulse Test: Pulse Width≤300µs, Duty Cycle≤2%









AMPLIFIER TRANSISTOR

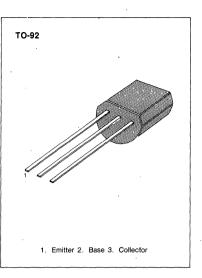
• Collector-Emitter Voltage: V_{CEO} = 100V

• Collector Dissipation: Pc (max)=625mW

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	100	V
Collector-Emitter Voltage	V _{CEO}	100	V
Emitter-Base Voltage	V _{EBO}	4	V
Collector Current	l _c	600	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	T	150	°C
Storage Temperature	Tstg	−55 ~ 150	•c

[•] Refer to 2N5401 for graphs



ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
*Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =1mA, I _B =0	. 100			V
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = 100 \mu A, I_{E} = 0$	100			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 10 \mu A, I_C = 0$	4			V
Collector Cut-off Current	Ісво	$V_{CB} = 50V, I_E = 0$	ĺ	,	1	μA
Emitter Cut-off Current	I _{EBO}	$V_{EB} = 3V, I_{C} = 0$	İ		100	nA
*DC Current Gain	h _{FE}	$I_C = 50 \text{mA}, V_{CE} = 5 \text{V}$	40		250	
*Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _O =10mA, I _B =1mA			0.25	V
_		I _C =50mA, I _B =5mA			0.3	V
*Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_C = 10 \text{mA}, I_B = 1 \text{mA}$,	1.2	V
· ·		$I_C = 50 \text{mA}$, $I_B = 5 \text{mA}$			1.2	V
Output Capacitance	Cob	$V_{CB} = 10V, I_{E} = 0$,	8	pF
		f=1MHz				
Current Gain Bandwidth Product	f⊤	I _C =10mA, V _{CE} =10V f=100MHz	60			MHz

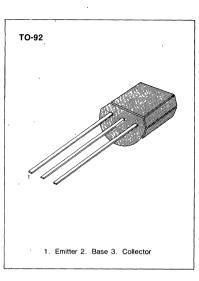
Pulse Test: Pulse Width≤300µs, Duty Cycle≤2%

2W OUTPUT AMPLIFIER OF PORTABLE RADIOS IN CLASS B PUSH-PULL OPERATION

- Complimentary to SS8550
- Collector Current Ic = 1.5A
- Collector Dissipation P_c=2W (T_c=25°C)

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

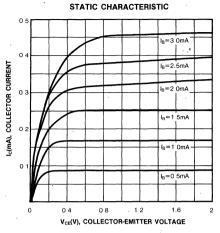
Characteristic	racteristic Symbol		
Collector-Base Voltage	V _{CBO}	40	V
Collector-Emitter Voltage	V _{CEO}	25	V
Emitter-Base Voltage	V_{EBO}	6	V
Collector Current	l _C	1.5	Α
Collector Dissipation	P _C	1	w
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-65~150	°C

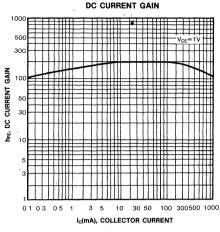


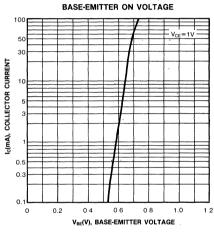
ELECTRICAL CHARACTERISTICS (Ta=25°C)

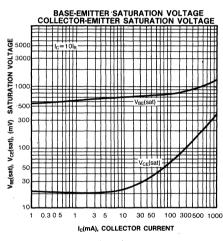
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C}=100\mu A, I_{E}=0$	40			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C=2mA$, $I_B=0$	25			v
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 100 \mu A, I_C = 0$	6			v
Collector Cutoff Current	I _{CBO}	V _{CB} =35V, I _E =0			100	nA
Emitter Cutoff Current	I _{EBO}	V _{EB} =6V, I _C =0			100	nA
DC Current Gain	h _{FE} 1	V _{CE} =1V, I _C =5mA	45	135		
	h _{FE} 2	V _{CE} =1V, I _C =100mA	85	160	300	
	h _{FE} 3	V _{CE} =1V, I _C =800mA	40	110		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =800mA, I _B =80mA		0.28	0.5	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =800mA, I _B =80mA		0.98	1.2	V
Base-Emitter Voltage	V _{BE}	V _{CE} =1V, I _C =10mA		0.66	1	V
Output Capacitance	Cob	$V_{CB} = 10V, I_E = 0$	İ	9.0		pF
		f=1MHz				
Current Gain-Bandwidth Product	f _T	V _{CE} =10V, I _C =50mA	100	190		MHz

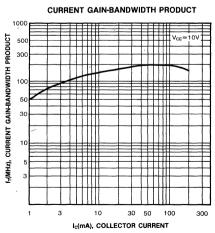
Classification	В	С	D
h _{FE} (2)	85-160	120-200	160-300

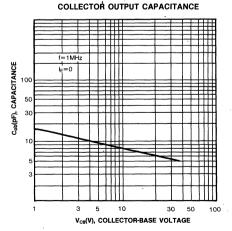










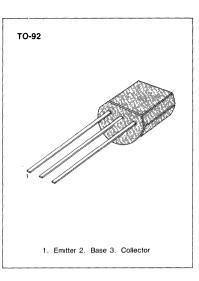


2W OUTPUT AMPLIFIER OF PORTABLE RADIOS IN CLASS B PUSH-PULL OPERATION

- Complimentary to SS8050
- Collector Current I_C = −1.5A
- Collector Dissipation Pc=2W (Tc=25°C)

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

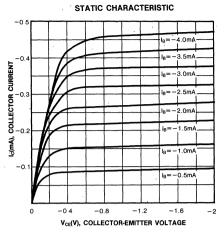
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-40	٧
Collector-Emitter Voltage	V _{CEO}	25	V
Emitter-Base Voltage	V _{EBO}	-6	V
Collector Current	l _C	-1.5	Α
Collector Dissipation	P _C	1	w
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-65~150	°C

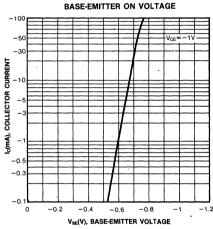


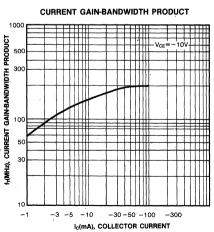
ELECTRICAL CHARACTERISTICS (Ta=25°C)

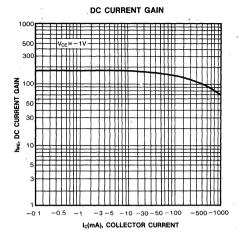
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C} = -100 \mu A, I_{E} = 0$	-40			٧
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -2mA, I_{B} = 0$	-25			V
Emitter-Base Breakdown Voltage	BV_{EBO}	$I_E = -100 \mu A$, $I_C = 0$	-6			V.
Collector Cutoff Current	I _{CBO}	$V_{CB} = -35V$. $I_F = 0$			-100	nA
Emitter Cutoff Current	I _{EBO}	$\dot{V}_{EB} = -6V, I_C = 0$			-100	nA
DC Current Gain	h _{FE} 1	$V_{CE} = -iV$, $I_C = -5mA$	45	170		
·	h _{FE} 2	$V_{CE} = -1V, I_{C} = -100 \text{mA}$	85	160	300	·
	h _{FF} 3	$V_{CE} = -1V, I_{C} = -800 \text{mA}$	40	80		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{C} = -800 \text{mA}, I_{B} = -80 \text{mA}$		-0.28	-0.5	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_{C} = -800 \text{mA}, I_{B} = -80 \text{mA}$		-0.98	-1.2	V
Base Emitter Voltage	V_{BE}	$V_{CF} = -1V$. $I_C = -10mA$		-0.66	-1.0	V
Output Capacitance	Cob	$V_{CB} = -10V$. $I_E = 0$		15		pF
		f= 1 MHz				
Current Gain-Bandwidth Product	f⊤	$V_{CE} = -10V, I_{C} = -50mA$	100	200		MHz

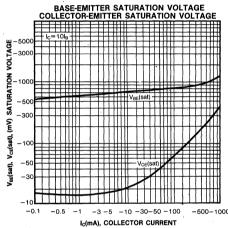
Classification	В	С	D
h _{FE} (2)	85-160	120-200	160-300

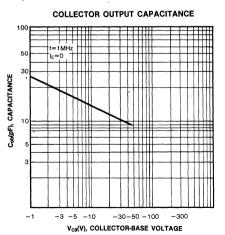










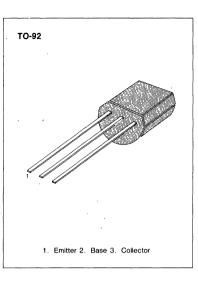


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AM CONVERTER, AM/FM IF AMPLIFIER GENERAL PURPOSE TRANSISTOR

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

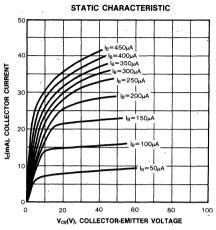
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	V
Collector-Emitter Voltage	V _{CEO}	30	V
Emitter-Base Voltage	V _{EBO}	5	V
Collector Current	l _C	30	mA
Collector Dissipation	Pc	400	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55∼150	°C

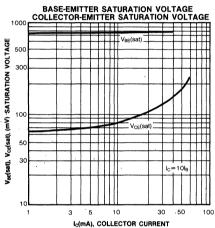


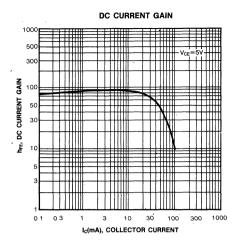
ELECTRICAL CHARACTERISTICS (Ta=25°C)

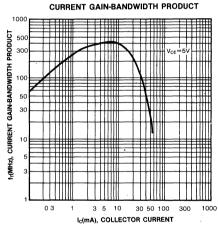
Charactéristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =100μA, I _E =0	50			. V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C=1$ mA, $I_B=0$	30			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 100 \mu A, I_C = 0$	5			V
Collector Cutoff Current	I _{CBO}	$V_{CB} = 50V, I_{E} = 0$			100	nA
Emitter Cutoff Current	I _{EBO}	V _{EB} =5V, I _C =0			100	nA
DC Current Gain	h _{FE}	$V_{CF}=5V$, $I_C=1$ mA	28	90	198	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1mA		0.08	0.3	V
Base-Emitter Voltage	V _{BE}	$V_{CE}=5V$, $I_{C}=1$ mA	0.65	0.7	0.75	V
Output Capacitance	C _{ob}	$V_{CB}=10V$, $I_{E}=0$ f=1MHz		1.5		pF
Current Gain-Bandwidth Product	f _T	$V_{CE}=5V$, $I_{C}=1$ mA	150	370		MHz
Noise Figure	NF	$V_{CE} = 5V$, $I_{C} = 1.0 \text{mA}$ $f = 1 \text{ MHz}$, $Rs = 500 \Omega$		2.0	4.0	dB

Classification	D	E	F	G	н	ı
h _{FE}	28-45	39-60	54-80	72-108	97-146	132-198







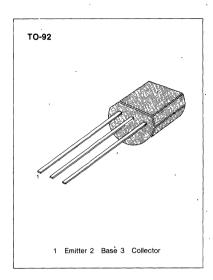


1W OUTPUT AMPLIFIER OF POTABLE RADIOS IN CLASS B PUSH-PULL OPERATION.

- High total power dissipation. (PT=625mW)
- High Collector Current. (Ic = -500mA)
- Complementary to SS9013
- Excellent hee linearity.

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-40	V
Collector-Emitter Voltage	V _{CEO}	-20	V
Emitter-Base Voltage	V_{EBO}	-5	V
Collector Current	l _C	-500	mA
Collector Dissipation	Pc	625	·mW
Junction Temperature	Ti	150	°C
Storage Temperature	Tstg	-55~150	°C

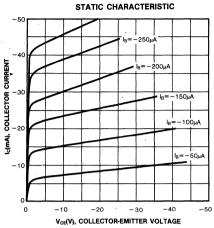


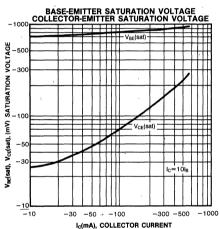
ELECTRICAL CHARACTERISTICS (Ta=25°C)

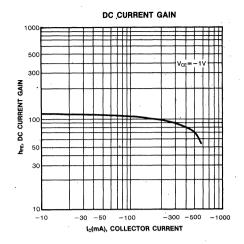
Characteristic	Symbol	Test Condition	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =-100μA, I _E =0	-40			٧
Collector-Emitter Breakdown Voltage	BV_{CEO}	$I_C = -1 \text{ mA}, I_B = 0$	-20			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = -100 \mu A, I_C = 0$	-5			V
Collector Cutoff Current	Ісво	$V_{CB} = -25V, I_{E} = 0$			-100	nA
Emitter Cutoff Current	I _{EBO}	$V_{EB} = -3V, I_{C} = 0$			-100	nA
DC Current Gain	h _{FE} 1	$V_{CE} = -1V, I_{C} = -50mA$	64	120	202	
!	h _{FE} 2	$V_{CE} = -1V$, $I_{C} = -500$ mA	40	90		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{\rm C} = -500 \text{mA}, I_{\rm B} = -50 \text{mA}$		-0.18	-0.6	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_{c} = -500 \text{mA}, I_{B} = -50 \text{mA}$		-0.95	-1.2	V
Base-Emitter On Voltage	V _{BE} (on)	$V_{CE} = -1V, I_{C} = -10mA$	-0.6	-0.67	-0.7	V

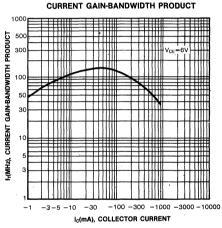
hfe (1) CLASSIFICATION

Classification	D	E	F	G	н
h _{FE} (1)	64-91	78-112	96-135	112-166	144-202







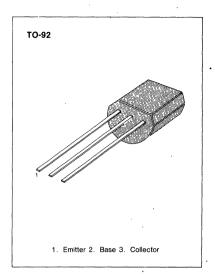


1W OUTPUT AMPLIFIER OF POTABLE RADIOS IN CLASS B PUSH-PULL OPERATION.

- High total power dissipation. (PT=625mW)
- High Collector Current. (Ic=500mA)
- Complementary to SS9012
- · Excellent hee linearity.

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

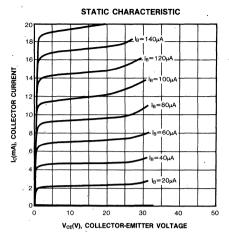
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	40	V
Collector-Emitter Voltage	V _{CEO}	20	V
Emitter-Base Voltage	V _{EBO}	5	V
Collector Current	lc	500	mA
Collector Dissipation	Pc	625	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55∼150	°C

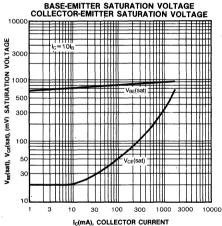


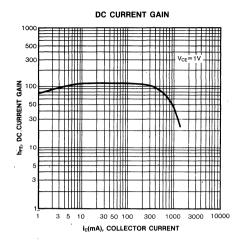
ELECTRICAL CHARACTERISTICS (Ta=25°C)

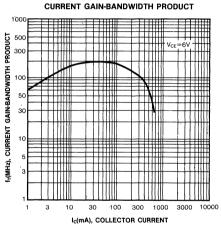
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =100μA, I _E =0	40			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =1mA, I _B =0	20			V.
Emitter-Base Breakdown Voltage	BV _{EBO}	I _E =100μA, I _C =0	- 5			V
Collector Cutoff Current	СВО	V _{CB} =25V, I _E =0			100	nA
Emitter Cutoff Current	I _{EBO}	$V_{EB}=3V$, $I_{C}=0$			100	nA
DC Current Gain	h _{FE} 1	V _{CE} =1V, I _C =50mA	64	120	202	
	h _{FE} 2	V _{CE} =1V, I _C =500mA	40	120		
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =500mA, I _B =50mA		0.16	0.6	· V
Base-Emitter Saturation Voltage	V _{BE} (sat)	I _C =500mA, I _B =50mA		0.91	1.2	V
Base-Emitter On Voltage	V _{BE} (on)	$V_{CE}=1V$, $I_{C}=10mA$	0.6	0.67	0.7	V

Classification	D E		F	G	н	
h _{FE} (1)	64-91	78-112	96-135	112-166	144-202	







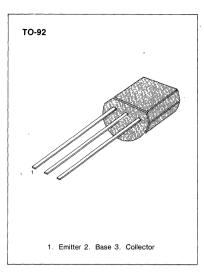


PRE-AMPLIFIER, LOW LEVEL & LOW NOISE

- High total power dissipation. (PT=450mW)
- High hee and good linearity
- Complementary to SS9015

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

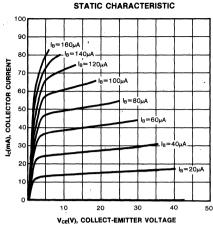
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	50	V
Collector-Emitter Voltage	V _{CEO}	45	v
Emitter-Base Voltage	V _{EBO}	5	V
Collector Current	l _c	100	· mA
Collector Dissipation	Pc	450	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55∼150	°C

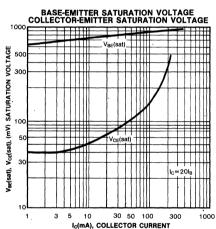


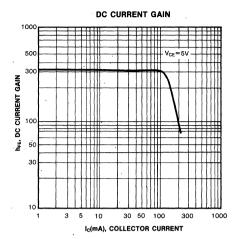
ELECTRICAL CHARACTERISTICS (Ta=25°C)

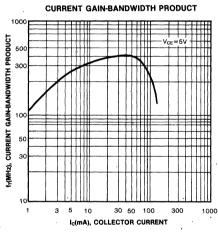
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C}=100\mu A, I_{E}=0$	50			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =1mA, I _B =0	45			V
Emitter-Base Breakdown Voltage	BV _{EBO}	I _E =100μA, I _C =0	5			V
Collector Cutoff Current	I _{CBO}	V _{CB} =50V, I _E =0			50	nA
Emitter Cutoff Current	I _{EBO}	V _{EB} =5V, I _C =0			50	nA
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =1mA	60	280	1000	
Collector-Base Saturation Voltage	V _{CE} (sat)	I _C =100mA, I _B =5mA		0.14	0.3	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_C=100mA$, $I_B=5mA$		0.84	1.0	V
Base-Emitter On Voltage	V _{BE} (on)	V _{CE} =5V, I _C =2mA	0.58	0.63	0.7	V
Output Capacitance	Cob	V _{CB} =10V, I _E =0		2.2	3.5	pF
		f=1MHz				
Current Gain-Bandwidth Product	f⊤	$V_{CE}=5V$, $I_{C}=10mA$	150	270		MHz
Noise Figure	NF	$V_{CE}=5V$, $I_{C}=0.2mA$		0.9	10	dB
		$f=1$ KHz, $R_s=2$ K Ω				

Classification	ification A		. с	D _.	
h _{FE}	60-150	100-300	200-600	400-1000	







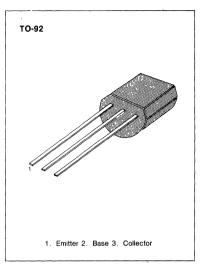


LOW FREQUENCY, LOW NOISE AMPLIFIER

• Complement to SS9014

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

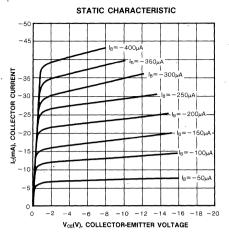
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	-50	V
Collector-Emitter Voltage Emitter-Base Voltage	V _{CEO} V _{EBO}	-45 -5	V
Collector Current Collector Dissipation	l _c .	-100 450	mA mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55~150	°C

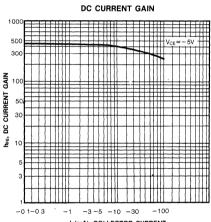


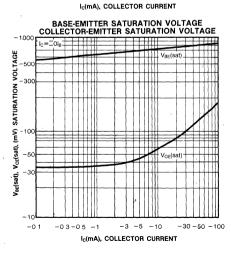
ELECTRICAL CHARACTERISTICS (Ta=25°C)

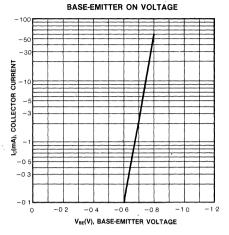
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit .
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =-100μA, I _E =0	-50			V
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_{C} = -1 \text{ mA}, I_{B} = 0$	-45			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = -100 \mu A$, $I_C = 0$	~ 5·			V
Collector Cutoff Current	I _{CBO}	$V_{CB} = -50V, I_E = 0$			-50	nA
Emitter Cutoff Current	I _{EBO}	$V_{EB} = -5V, I_{C} = 0$			-50	nA
DC Current Gain	h _{FE} .	$V_{CE} = -5V, I_{C} = -1mA$	60	200	600	
Collector-Base Saturation Voltage	V _{CE} (sat)	$I_{c} = -100 \text{mA}$. $I_{B} = -5 \text{mA}$		-0.2	-0.7	V
Base-Emitter Saturation Voltage	V _{BE} (sat)	$I_{C} = -100 \text{mA}, I_{B} = -5 \text{mA}$		-0.82	-1.0	V
Base-Emitter On Voltage	V _{BE} (on)	$V_{CE} = -5V I_{C} = -2mA$	-0.6	-0.65	-0.75	V
Output Capacitance	Cob	$V_{CB} = -10V, I_E = 0$		4.5	7.0	pF
0		f=1MHz				1
Current Gain-Bandwidth Product	f⊤	$V_{CE} = -5V, I_{C} = -10mA$	100	190		MHz
Noise Figure	NF	$V_{CE} = -5V$, $I_{C} = -0.2mA$		0.7	10	dB
•		f=1KHz, Rs = 1KΩ				

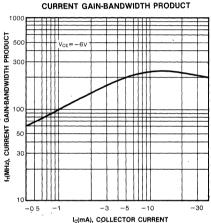
Classification A		В	С	
h _{FE}	60-150	100-300	200-600	

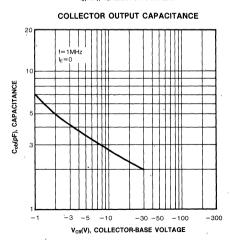












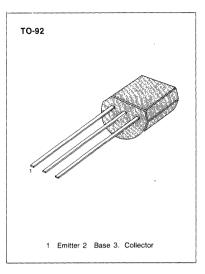
3

AM CONVERTER, FM/RF AMPLIFIER OF LOW NOISE.

• High total power dissipation. (PT=400mW)

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

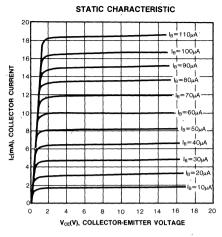
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	30	V
Collector-Emitter Voltage	V _{CEO}	20	V
Emitter-Base Voltage	V _{EBO}	4	V
Collector Current	lc	25	mA
Collector Dissipation	Pc	400	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55∼150	°C

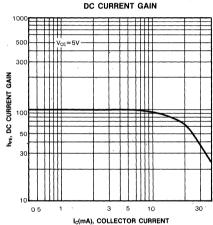


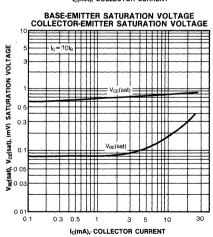
ELECTRICAL CHARACTERISTICS (Ta=25°C)

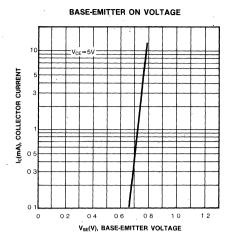
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	I _C =100μA, I _E =0	30			٧
Collector-Emitter Breakdown Voltage	BV _{CEO}	$I_C=1$ mA, $I_B=0$	20			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 100 \mu A, I_C = 0$	4			V
Collector Cutoff Current	I _{CBO}	$V_{CB} = 30V, I_{E} = 0$			100	nΑ
Emitter Cutoff Current	I _{EBO}	$V_{EB} = 3V, I_{C} = 0$			100	nA
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =1mA	28	.90	198	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1mA		0.1	0.3	V
Base-Emitter On Voltage	V _{BE} (on)	V _{CE} =5V, I _C =1mA		0.72		V
Output Capacitance	Cob	$V_{CB} = 10V, I_{E} = 0$ f = 1MHz		1.2	1.6	pF
Current Gain-Bandwidth Product	f⊤	$V_{CE} = 5V$, $I_{C} = 1 \text{ mA}$	400	620		MHz
Noise Figure	NF	$V_{CE} = 5V$, $I_{C} = 1.0 \text{mA}$ $f = 1.00 \text{MHz}$, $R_{S} = 50 \Omega$.50	3.0	5.0	dB

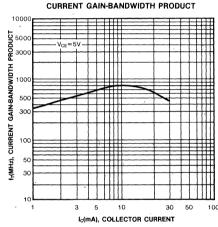
Classification	D	E	F	G	н	ŀ
h _{FE}	28-45	39-60	54-80	72-108	97-146	132-198

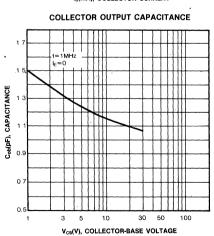












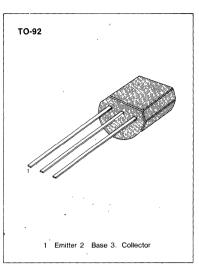
3

AM/FM IF AMPLIFIER, LOCAL OSCILLATOR OF FM/VHF TUNER

• High Current Gain Bandwidth Product f₇=1,100 MHz (Typ)

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

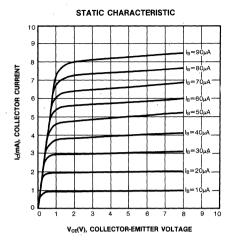
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V _{CBO}	30	V
Collector-Emitter Voltage	V _{CEO}	15	V
Emitter-Base Voltage	V _{EBO}	5	V
Collector Current	lc	50	mA
Collector Dissipation	Pc	400	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55~150	°C

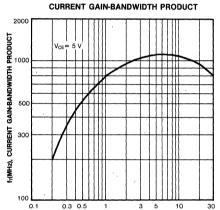


ELECTRICAL CHARACTERISTICS (Ta=25°C)

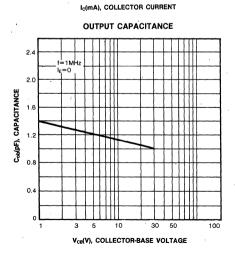
Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
Collector-Base Breakdown Voltage	BV _{CBO}	$I_{C}=100\mu A, I_{E}=0$	30			· v
Collector-Emitter Breakdown Voltage	BV _{CEO}	I _C =1.0mA, I _B =0	15			V
Emitter-Base Breakdown Voltage	BV _{EBO}	$I_E = 100 \mu A, I_C = 0$	5			V
Collector Cutoff Current	I _{CBO}	V _{CB} =12V, I _E =0			50	nA
DC Current Gain	h _{FE}	V _{CE} =5V, I _C =1.0mA	28	100	198	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C =10mA, I _B =1mA			0.5	V
Output Capacitance	Cob	$V_{CB} = 10V, I_{E} = 0$		1.3	1.7	pF
,		f=1MHz		,		
Current Gain-Bandwidth Product	f⊤	V _{CE} =5V, I _C =5mA	700	1100		MHz

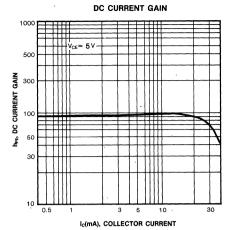
Classification	D	E	F	G	٠н	ı
h _{FE}	28-45	39-60	54-80	72-108	97-146	132-198

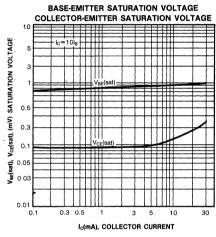




0.3 0.5

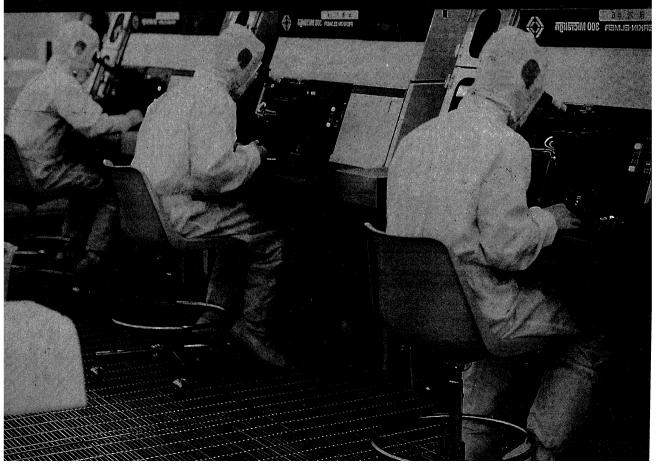




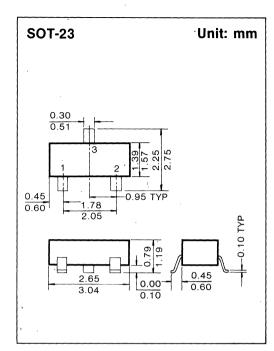


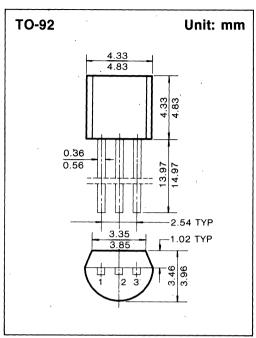


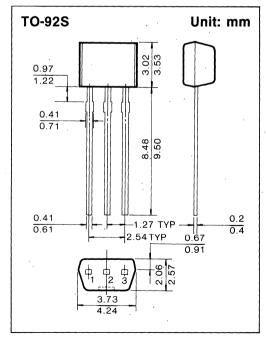
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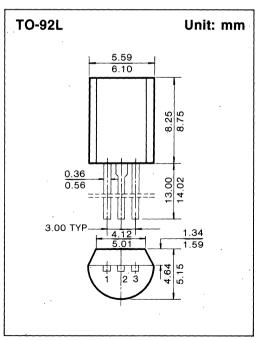




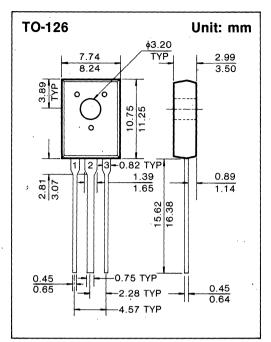


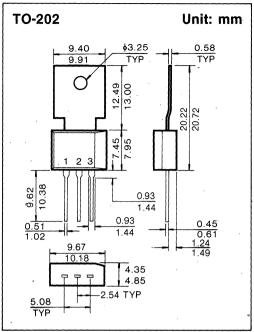


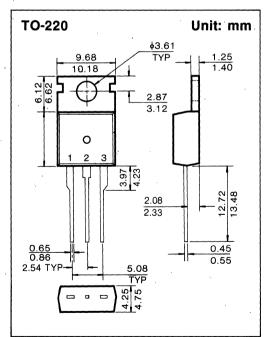


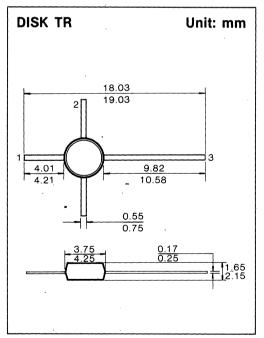


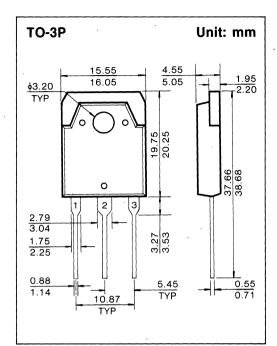
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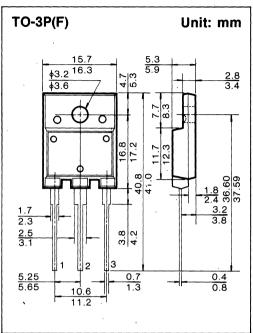


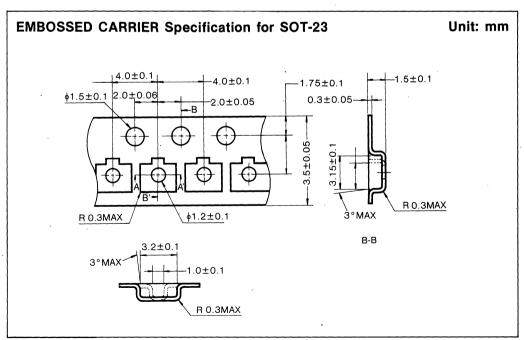


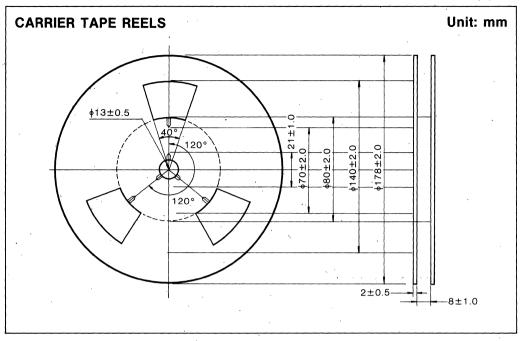


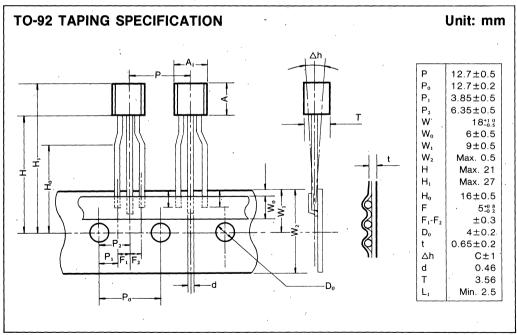






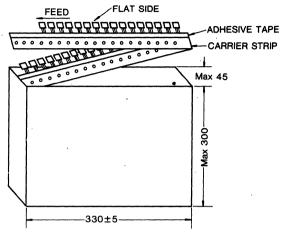






TO-92 AMMO PACK

Unit: mm



FLAT SIDE OF TRANSISTOR and ADHESIVE TAPE VISIBLE

SAMSUNG'S AMMO PACK is equivalent to styles A,B,C,D of reel pack depending on which box-flat is opened and which end of the box the deviçes are fed from.

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